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E. BIBL. RADCL.

Per 1534 d. 218.



THE JOURNAL
OF
PSYCHOLOGICAL MEDICINE:

A QUARTERLY REVIEW OF

DISEASES OF THE NERVOUS SYSTEM, MEDICAL
JURISPRUDENCE AND ANTHROPOLOGY.

EDITED BY

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ORIGINAL COMMUNICATIONS.

ART. I.—*Clinical Lectures delivered at the Bellevue Hospital Medical College, Session of 1870-'71.* By WILLIAM A. HAMMOND, M. D., Professor of Diseases of the Mind and Nervous System, and of Clinical Medicine; Physician-in-Chief to the New York State Hospital for Diseases of the Nervous System, etc. Reported and the Histories prepared by T. M. B. Cross, M. D., Assistant to the Chair of Diseases of the Mind and Nervous System; and Resident Physician of the New York State Hospital for Diseases of the Nervous System.

LECTURE I.

PARTIAL CEREBRAL ANÆMIA, THE RESULT OF THROMBOSIS AND EMBOLISM.

GENTLEMEN: The cases which I am enabled to present to you to-day illustrate a variety of disease which has lately attracted considerable attention, not only as regards the immediate symptoms, but likewise the remarkable secondary conditions which frequently result. Not many years ago the disease in question was confounded with cerebral hæmorrhage, and other causes of apoplexy, but, thanks to the labors of Virchow and others, its pathology is now more clearly understood.

I refer to partial cerebral anæmia produced by obstruction to the circulation of the brain by some cause existing within the cranium—generally, occlusion of one or more of the cerebral arteries.

This obliteration may be due to two cognate affections, namely, thrombosis and embolism. I will proceed now to read to you the history of the case of William Wice.

CASE I. *Ataxic Aphasia with Right Hemiplegia, the Result of Thrombosis.*—"William Wice, forty-one years of age, married, a native of Prussia. Has of late years been engaged in the shoe-business. His parents were long-lived, healthy people, and he does not remember among his kinfolk any that were afflicted with diseases of the nervous system. He gives no history of ever having had either syphilis or acute articular rheumatism, but, on the contrary, says he has enjoyed remarkably fine health until the commencement of his present trouble. He is a man of intelligence, and has always led a very temperate life. During the month of March, 1868, he was seized with a dull pain in the right knee, accompanied with numbness. There soon followed formications and pricking sensations limited to the right foot, together with numbness and feelings of heat and cold, confined more especially to the toes of the right side. From the toes these abnormal sensations gradually extended upward, and at the end of two weeks had reached the shoulder, when the patient became aware that he was totally hemiplegic. During this attack his consciousness was unaffected, and his organs of special sense, excepting touch, were unimpaired. The 11th of May following, the patient suddenly lost the power of speech, but did not even experience the slightest disturbance of consciousness. His mind, as he avers, was clear, and, although he was unable to utter a single word, yet he understood perfectly whatever was said to him. He remained completely aphasic for four months, being only able during this time to utter a few sounds, which could not be interpreted into intelligible words.

"About September, 1868, he began to enunciate a few words, at first very slowly and indistinctly, and has gradually acquired more facility, although his power of coördination was very far from perfect when he first came under our observation. His

paralysis remained nearly a year complete; when under treatment it began to improve. Six months after he was paralyzed he had an abscess on the right leg, above the ankle, which remained open for the period of a year.

"The patient was admitted to the out-door department of the New York State Hospital for Diseases of the Nervous System, August 22, 1870, and presented the following points of interest:

"There was hemiplegia of the right side of the body, including the arm and the leg, but the face was unaffected. There was no strabismus, no paralysis of the muscles of the eye, nor of those of expression. The pupils on both sides were very much contracted, and yet readily dilated under the influence of atropia. The tongue did not deviate to either side. His eye-sight, hearing, and other special senses, were unimpaired, if we except tactile sensibility. His intellect was as clear as ever. There was no loss of the memory of words, no impairment of the motor power of the tongue, but simply a defect in the faculty of coördination of the muscles used in the act of speaking. The patient found more difficulty in pronouncing labials and linguals than gutturals. There was much atrophy of the muscles of the right side of the body, but the process of degeneration was considerably more advanced in the arm.

"The arm hung uselessly by the side of the patient, and, with the exception of a slight impulse which he could give voluntarily to the fingers of the right hand, muscular power appeared to be nearly abolished. He could not bend the arm on the forearm, nor raise the arm by means of the deltoid. Motor power, as measured by the dynamometer, in the right hand was scarcely appreciable. Tactile sensibility, electro-muscular sensibility, and contractility, together with temperature, were markedly diminished in the right arm, while sensibility to pain and deep pressure were normal.

"The leg was much paralyzed and everted, yet with very great difficulty the patient was able, with the assistance of a cane, to move very slowly about. He could not flex the leg on the thigh, and when he walked he kept the leg perfectly straight while he dragged the foot along with a shuffling gait, making it at times describe the arc of a circle. The toe was

caught at nearly every step, owing to paresis of the extensor muscles of the leg. Here also there was diminution of tactile sensibility, electro-muscular sensibility, and contractility, while differences in temperature were easily detected. Bladder, rectum, and urine, normal. Heart-sounds natural. Lungs healthy. He could not whistle, when admitted, from want of power to purse up the lips, yet he could expectorate without difficulty. In talking he had a peculiar hesitating, stammering manner, highly characteristic of his disease, but he did not express that impatience and repetition of the same word so often found in patients suffering from amnesic aphasia. There were certain sentences which he was totally unable to pronounce with any degree of accuracy, even after much effort, such as 'truly rural,' 'National Intelligencer,' 'Peter Piper,' and other words abounding in labials and linguals. After dilating both pupils with atropia the eyes were carefully examined by the ophthalmoscope on different occasions, and there was found a circle of atrophy around the *porus opticus* of each eye, together with more or less *anæmia* of the vessels of the retina."

Now, let us inquire what is the cause of the hemiplegia and difficulty of speech existing in this man. One point, which especially engages our attention at the very beginning of his history, is the slowness with which the loss of power and sensibility supervened. We argue from that one fact very definitely that the case is evidently not one of cerebral hæmorrhage. Reserving any further remarks relative to the diagnosis, let us inquire how nearly his symptoms coincide with those met with in thrombosis.

By thrombosis is understood a condition in which an artery, in consequence of a change taking place, undergoes narrowing of its calibre owing to the deposition of fibrine, from the blood. The clot thus formed is called a thrombus. One of the chief features connected with the development of the symptoms in thrombosis is slowness, and you can very readily understand why this should be the case. The symptoms which are observed are due to *anæmia* of those parts of the brain supplied by the diseased vessel, and as the morbid process by which the artery is eventually closed takes place gradually, there is therefore no sudden development of the symptoms.

These very frequently consist, in the first place, of pain

in the head, vertigo, and more or less confusion of ideas. In several cases which have come under my notice the pupil of the affected side was dilated, and there were ptosis and strabismus; and there may be at a very early period in the progress of the disease marked difficulties in the faculty of speech, but there do not appear to have been in this instance any mental disturbances or others connected with the movements of the eye or of the tongue.

It is one of those cases in which the first evidence of disease is connected with the loss of power and sensibility in some distant part of the body.

Thus in Wice's case there were pain, numbness, formication, tingling, and other evidences of disordered sensibility in the right leg, accompanied with loss of power, and it frequently happens that these symptoms exist in very limited regions of the body, such as a single limb, or a part of a limb, or they may be restricted entirely to some portion of the face. In the case of a gentleman now under my care the paralysis is confined to the muscles supplied by the ulnar nerve, and those concerned in deglutition.

Now, in the case of Wice we notice further that the paralysis gradually extended up the limb until the whole side was involved, and that with this progress other notable symptoms made their appearance. We are therefore justified in concluding that the advance in the symptoms was the result of the gradual development of the morbid process within the cranium.

Certainly it is very remarkable that there should have been at no time any symptoms indicating derangement of the intellectual faculties, and none of those such as pain, vertigo, noises in the ears, or disturbances of vision, which are so commonly associated with brain-disease. One feature, however, is of very great interest, and that is the difficulty of speech, and it is likewise important to notice that the hemiplegia is on the right side. Hence we know with certainty that the brain-lesion is on the left side.

There is a very important artery in the brain, called the middle cerebral, which is lodged in the fissure of Sylvius. We are warranted, by a great many cases in point, in concluding that the organ of speech is somewhere in the region of this

fissure, which, as you know, separates the anterior from the middle lobe of the brain.

Without presuming to define its location and extent with as absolute accuracy as some observers, I am satisfied that it is in the immediate vicinity of this fissure, and probably, as Broca has affirmed, in the posterior part of the third left frontal convolution, or, as later investigations would seem to show, in the island of Reil.

It is not my intention on the present occasion to enter into a full consideration of the subject of aphasia, for I shall have abundant opportunities during the present session of showing you more strongly-marked cases; I will merely, therefore, say now that by aphasia we mean a difficulty of speech either resulting from a loss of the memory of words, or due to an impossibility of coördinating the muscles concerned in articulation so as to pronounce them.

In the present case there is no defect as regards the memory of words, the trouble is altogether with the muscles of speech. You must recollect, however, that paralysis of the tongue or lips may render the speech indistinct or impossible, but in this case there is no paralysis of those muscles. The patient is able to move his tongue in all possible directions, to open and shut his mouth, and to perform all the normal facial movements.

You observe, however, that when I ask him to say a word beginning with a labial letter, such as baker or piper, he is unable to do so. His mouth closes spasmodically, and no sound comes forth.

The gutturals he can pronounce without difficulty; the linguals are somewhat troublesome, but not quite so much so as the labials.

He, therefore, labors under what is called the ataxic form of aphasia. From the symptoms met with in this case, I think we are safe in concluding that the patient is affected with thrombosis of the left middle cerebral artery, and that in all probability the collateral circulation has been established to a considerable extent, for there is no lack of intelligence, and there has been no advancement in the symptoms since the occurrence of the aphasia, at which time we may presume the artery became entirely closed.

He therefore now suffers simply from the vestigia, or the remains, and from which he will continue to suffer unless subjected to proper treatment.

Perhaps, before proceeding to the treatment applicable to this case, I ought to say something more to you of the natural history of the disease in question, but I have no idea of considering fully, in the clinical lectures I shall give you here, much more than the practical points of the disease under notice, and I have already indicated to you briefly most of the important features of its course.

I may, however, say that, as regards causes, thrombosis may be due to atheroma of the artery, by reason of which its elasticity is lessened and its lining membrane rendered rough. The circulation is therefore retarded, and this condition, with the roughened wall, favors the deposition of fibrine upon its internal surface. Again, compression may be exercised by tumors, whereby the calibre of the artery is diminished, and the fibrine thus allowed to accumulate, or the difficulty may exist in the heart, which, through fatty degeneration or other cause impairing its strength, lessens the force and rapidity of the circulation.

Among the predisposing causes are age, the disease being rare in persons under fifty years old, luxurious habits of living with insufficient exercise, and, perhaps, inordinate mental exertion.

The prognosis is generally unfavorable, from the fact that, although the disease may advance slowly, and may even be spontaneously arrested in its progress, the tendency to softening always exists. The inadequacy of any medical treatment to control the morbid process also renders the prognosis more grave. It is rare indeed that the powers of Nature are so effectual in restoring the functions of a brain impaired by thrombosis as they have been in the patient before us.

The treatment proper in this case should be directed to the relief of the paralysis, and the restoration of the power of speech. Two agents are especially indicated, namely, strychnia and electricity, and perhaps we may derive benefit from phosphorus. I shall therefore give him a hypodermic injection of about one-thirtieth of a grain of the sulphate of strychnia every alternate day, apply the induced or Faradaic current

to the paralyzed arm and leg, and the constant current in such a manner as to cause it to act upon the brain, and enlarge its blood-vessels, and improve its nutrition. This can be done by placing one pole upon each mastoid process, or one upon the forehead, and the other upon the nape of the neck, or the negative pole over the sympathetic nerve, while the positive is rubbed up and down the back, from the second or third cervical to the fifth or sixth dorsal vertebra. At the same time a mixture, consisting of half an ounce of the phosphorated oil, one ounce of the mucilage of acacia, and forty drops of the oil of bergamot, should be prepared, of which fifteen drops are to be given three times a day in water. Under this plan of treatment I shall expect his paralyzed limbs to improve, and his speech to become more perfect.

[NOTE.—The essential details of the treatment above indicated have been carefully carried out up to the present time (November 15th), and the case has so far been marked by gradual progressive improvement. Since October 26th the induced or Faradaic current has been applied with advantage to the muscles of the tongue and lips regularly three times a week. The condition of Wice is now as follows:

There is some hesitation in his speech, but he has much more command in coördinating the movements of the muscles of the tongue and lips than he had only a short time ago; he can now articulate quite distinctly the words "truly rural," "National Intelligencer," "baker," and "Peter Piper." He can purse up the lips, although as yet he cannot whistle. The pupils are both contracted, but have increased somewhat in size. The vessels of the retinae are larger, more tortuous, and fuller, and the circulation therein has much improved. The degeneration of the *porus opticus* has not increased. The muscles of the right upper extremity have gained so considerably in power that the patient is now able to flex the forearm on the arm, raise the arm at a right angle to the body, and retain things quite readily when placed in his hand. When his arm is lifted above his head, he can keep it there voluntarily. The improvement in the leg is not less in degree than that in the arm and forearm. He can partially flex the leg, although very slowly. The foot is still everted, but not to such an extreme angle. When he walks, he lifts the toe well off the

ground, and swings the leg much less than formerly. All the muscles of the diseased side respond to a weak Faradaic current. Sensibility is gradually returning, while the temperature and nutrition of the limbs are constantly increasing. The patient enjoys excellent health, and has so far recovered that he intends to make an attempt to earn his livelihood by engaging in some light business, which only requires a moderate amount of activity.—T. M. B. C.]

We have another affection by which an artery may be closed, and for a complete idea of which we are indebted to Virchow, and that is the condition designated by him embolism. An embolus is a clot originally formed in some distant part of the body, on the cardiac or arterial walls, and which, becoming detached by the action of the blood, is carried by the current to the vessel in which it is subsequently found. Here it causes occlusion, producing effects similar to those due to a thrombus.

Now, you will observe, as regards embolism, that there does not necessarily exist any previous disease of the artery, which, on the contrary, may be and generally is entirely healthy, in which respect there is a marked difference between embolism and thrombosis. Emboli may originate in almost any part of the body, but they are generally the result of endocarditis involving the left side of the heart, and this in its turn is frequently a sequence of acute articular rheumatism. You have therefore a very interesting series of morbid phenomena, beginning with inflammation of the fibrous structures about a joint, and ending, in the case of cerebral embolism, with paralysis, coma, and other symptoms of disordered brain-action.

You will not have failed to notice, gentlemen, from the brief outline I have given you of the course of embolism, that the symptoms due to occlusion of the artery must be manifested with great suddenness. A man, for instance, has suffered from rheumatism, and subsequently from endocarditis; he has mitral or aortic regurgitation, from insufficiency of the valves, directly due to fibrinous concretions, preventing their perfect action. One of these concretions becomes detached, it enters the aorta, and there, following the stronger and more

direct current, passes into the left common carotid artery, thence into the internal carotid, and then, still following the stronger and more direct current, enters the middle cerebral artery, where it lodges. Such is its ordinary direction. It may by chance go into the innominate and subsequently be arrested in the right middle cerebral artery, or it may pass off through the subclavian, and then not enter the head at all.

But, of the emboli found in the brain, a very large proportion are discovered in the left middle cerebral artery.

The relations of the artery to the fissure of Sylvius and the anterior lobe of the brain, I have already indicated to you in my remarks on the previous case. With these prefatory remarks I will read the following history :

CASE II. *Amnesic Aphasia, with Right Hemiplegia.*—“Richard Murphy, aged twenty-five years, married, born in New York, a weaver by occupation. There is no history of any neurosis in his family. He has never had syphilis or acute articular rheumatism. He says he has always enjoyed good health and been temperate in his habits. One day during November, 1868, he noticed on taking off his boot that his right foot was unusually numb and cold, but he paid little attention to the fact, as it soon passed away. Being affected about this time with a severe vesicular eruption of the face, he was persuaded to apply thereto a strong solution of sulphate of iron, which rapidly produced erysipelas of the whole of that surface. When the erysipelas had reached its acme, he had his first stroke of hemiplegia of the right side just as he was descending a flight of stone steps. Suddenly and without the least warning, excepting a quick severe vertigo, he fell, but immediately arose, and, not yet having recovered himself sufficiently to have command over his limbs, fell again. With assistance he walked a short distance to his house, when his friends discovered that he was paralyzed on the right side. His face and tongue were drawn to the left side, while speech and memory were slightly impaired. The condition of his eye was not noticed. Reasoning *a priori*, the patient attributed his paralysis to the solution of the sulphate of iron which he had used. He immediately began to improve very rapidly, and in December following motility having nearly completely

returned, he was seized with a slight attack of delirium. During the month of February, 1869, the patient again suddenly became hemiplegic, with more marked sequelæ than in the previous seizure, but he did not wholly lose his consciousness. His leg improved slowly, but much more than his arm. In April, 1869, he resumed his occupation, that of a weaver, in the factory, but had to do light work on account of the deficient muscular power in his right arm. In July he had a third seizure, but after falling he immediately went to work again. From this time until May, 1870, he busied himself about the factory, and attended regularly to his daily avocations. His appetite and nutrition did not seem to be impaired, and he appeared to enjoy very good health. In May, 1870, suddenly the patient again became paralyzed; this time the paralysis involved the right leg more than the arm, but, owing to the already existing paralysis of the right upper extremity, it is very likely that attention was not called thereto. There was no loss of consciousness. The muscles of the eye, face, and tongue, were not affected. With assistance he walked home, and in about a week had quite recovered from this attack. The treatment had been, up to this time, strychnine internally, with blisters behind the ears. During July last, while chopping wood, he was suddenly taken with an intense pain in the left side of his head, followed by vertigo; after falling, he arose, but again fell. On examination, his left pupil was found widely dilated. The patient was incoherent and delirious for four days. There was no apparent increased paralysis during this attack. After three weeks had elapsed, the patient went to work, but it was evident that his eye-sight and memory were much impaired. All these attacks were ushered in by a sudden severe vertigo, but were never followed by any convulsive movements.

“The patient was admitted to the Out-door Department of the New York State Hospital for Diseases of the Nervous System, September 1, 1870, when he was found to be in the following condition: There was deficient muscular power on the right side, although very slight in degree. The right arm was more paralyzed than the leg. The patient, however, said he was as strong as ever in that part of the body. His face had a peculiar, meaningless expression, differing from

the intelligent look of many aphasic patients. The right side of the face was not at that time paralyzed. There was the loss of the memory of words, but no paralysis of the muscles of the eye or of the tongue, and no defect in the coördination of the muscles of the tongue used in the act of speaking. Eye-sight impaired. Patient could not read or write. He understood whatever was said to him perfectly, yet, if he were asked to repeat a complex sentence, the memory of the words had departed, and he could not recall them. Bladder and rectum were normal. Sensibility on the right side was normal. The patient is naturally left-handed, which may account for the difference in muscular power. A sister has heart-disease, and the patient himself has hypertrophy with aortic insufficiency. Lungs were healthy. His lips and face are livid, and at times when he is cold this condition becomes quite striking."

Now let me proceed to give you an outline description of an ordinary attack of cerebral embolism. In the first place, there are no premonitory symptoms: the individual is perhaps engaged in his ordinary avocations, or is perfectly quiet, when he suddenly becomes apoplectic, and falls to the ground. His breathing is stertorous, his pulse slow and full, and the insensibility more or less complete. As soon as he can be aroused to such an extent as to enable him to execute volitional movements, it is found that he is partially or entirely paralyzed on one side of his body. Such is the severe form of the attack, and from this there are almost innumerable gradations to seizures of less gravity. Thus it often happens that consciousness is not lost; the patient falls simply from paralysis; and this loss of power may extend throughout the whole of one side, be limited to one or the other limb, or to the muscles of the face, or be restricted entirely to the tongue.

The subsequent history is very similar to that of a case of hemiplegia from cerebral hemorrhage, but differs in the very important points that the paralysis and other symptoms are more or less transitory, and, as far as my experience extends, there are no muscular contractions. I have seen several cases in which the faculty of speech was alone involved, either as regarded the memory of words or the power to articulate them by coördination of the proper muscles.

The duration of the symptoms depends upon the rapidity with which the collateral circulation is established, and, if the embolus be small and the physical powers of the patient good, they may last but for a very short time.

Trousseau, in his lecture upon aphasia, relates the case of one of his colleagues, who, while reading quietly in his library, suddenly discovered that he could not utter a single word. There was no paralysis anywhere, no loss of consciousness, and but slight confusion of ideas; at the end of twelve hours recovery was complete. There can be no reasonable doubt but that this was a case of cerebral embolism.

In the case of Murphy, there were five distinct attacks, all involving the right side, and accompanied with some difficulty of speech. From all there was tolerably complete recovery, so that even now there is scarcely a trace of paralysis in any part of his body; neither do there appear to be any mental symptoms except as regards the memory for words; in other respects, his memory is hardly at all impaired, his recollection of locality and circumstance is good, and his intelligence fully up to the average of his class. But if I ask him to repeat even a short sentence, such as "Will you go with me to the theatre?" or to say three or four consecutive words, as "tea, sugar, and coffee," you observe he is unable to do so. He utters the first word, stops, looks confused, and is unable to proceed; and yet there is no difficulty whatever in his enunciation: what he does say he says with perfect distinctness.

Now, from what I have said to you of embolism, and from a consideration of the history of this case, can there be a reasonable doubt that each attack of hemiplegia was due to an embolus—probably a small one lodging in the left middle cerebral artery—and that our assurance is rendered doubly sure by the fact that we find that condition existing in his heart which is best calculated to cause the formation of emboli on its lining membrane?

At times we have very great difficulty in distinguishing emboli from cerebral hæmorrhage. The phenomena of both conditions are often very similar, but the transient character of those due to embolism, the fact that the resultant hemiplegia is almost always on the right side, and that there is a history of rheumatism or organic disease of the heart in the

case, will ordinarily enable us to make a correct diagnosis. In the present case the treatment need not be very complex. I am inclined to think that phosphorus will prove beneficial, and that advantage may be gained by the passage of the primary current directly through the brain. At the same time much can be done for him by exercising his memory in regard to language. Several cases are on record, and one has occurred in my own experience, in which individuals much more aphasic than Murphy have again acquired the power of language by persistent and well-directed attempts to recollect words spoken to them.

On a subsequent occasion I shall bring this patient with others before you, and speak at greater length on the subject of aphasia.

LECTURE II.

ALTERNATE OR CROSS HEMIPLEGIA. CASE IN WHICH THERE WAS PROBABLE EXTRAVASATION OF BLOOD INTO THE PONS VAROLII.

No disease that I shall have to lecture upon to you is more important than cerebral hæmorrhage; we meet with it at all times, in all persons, and under all circumstances. It is a disease to which a certain class of individuals have reason to look forward with apprehension, for in an instant their lives may be destroyed, or they may be rendered imbecile or may be crippled for life.

It is only recently that medical writers have to any extent adopted the custom of naming a disease in accordance with its morbid anatomy; they have been too much in the habit of basing their nomenclature upon some one prominent symptom, which may be, and in fact generally is, common to several very different pathological states; thus, it was the case, and still is to a very great extent, that cerebral hæmorrhage was considered under the name of apoplexy; it would be just as proper to treat of phthisis under the designation of cough, for apoplexy is simply a symptom which we meet with in several very different cerebral affections, just as cough is not peculiar to any one disease of the lungs.

Cerebral hæmorrhage is a term applied to an extravasation of blood occurring either in the tissue of the brain or in its ventricles. It does not include meningeal hæmorrhage, which takes place upon the surface of the brain, and differs from it in several other important particulars. The effusion of blood is due to the rupture of a cerebral blood-vessel, and this rupture is ordinarily the result of a diseased condition of the vascular parietes.

This much is perhaps necessary as an introduction to the very interesting history which I will now proceed to read to you :

Cerebral Hæmorrhage with Cross-Paralysis and Left Hemiplegia.—"John J. H. Fetter, forty-two years of age, married, born in Pennsylvania. Has always followed agricultural pursuits until within a few years, when he learned the book-binding business, at which he has since worked. He is the father of fourteen children, of whom at the present time five are living. Eighteen years ago he had rheumatism, which succeeded a severe attack of gonorrhœa, since then he has had gonorrhœa several times and a soft chancre, but gives no history of syphilis.

"His mother's grandmother had paralysis at an advanced age, and with that exception his family, so far as he is aware, is perfectly free from any of the marked forms of disease of the nervous system ; but it is a curious coincidence that, while he is paralyzed on the left side, his wife is hemiplegic on the right. He has been a temperate man in all respects, if we except, perhaps, venereal excess, for the sexual passions in this patient are very highly developed. He says he has labored very hard all his life, and confined himself very closely to business.

"If we exclude rheumatism, gonorrhœa, and bilious remittent fever, the patient enjoyed for thirty-three years the very best of health, which was not otherwise marred, until the onset of this attack of paralysis which occurred on the evening of the 11th of October, 1861, while Mr. Fetter, who was at this time convalescing from a bilious remittent fever, was sitting quietly by the fire, when his attention was called to his left leg and foot, which had become quite devoid of feeling ; thinking that it was only the sensation of numbness which we

so often experience when pressure is made on the sciatic nerve while sitting, he arose and began to walk about, but discovered that it required more activity and a greater length of time for the leg to regain its accustomed sensibility than is usual when a person's foot is simply asleep as it is termed.

"After a while, however, this abnormal numb sensation disappeared, and the patient, feeling as well as ever, soon retired to rest, but was hardly asleep when he was aroused by the nurse for the purpose of fitting a key to a bureau drawer; he arose, executed her request, and returned to bed apparently without any difficulty, but shortly after this, desiring a glass of water, he called to the nurse, who, on arriving, was alarmed at the aspect of her patient, whose face was awry, and whose mouth was drawn to the left side. She now handed him a glass of water; he put the glass to what he supposed was his mouth, and as he imagined drank the contents, but soon discovered that he had poured the water all over himself and the bed. On moving about while in the dark, Fetter caught hold of his own left hand, but was not conscious of that fact, and would not be convinced until a light was brought and the truth proven, when the reality that he was paralyzed first flashed across his mind.

"On being examined after this attack, there was found to be loss of motility and sensibility on the left side of the body; the face was drawn to the left side, and this fact is still further corroborated by Mrs. Fetter, besides the testimony of the nurse and Mr. Fetter; the sensibility on the right side of the face was unimpaired. Vision in the left eye was so much affected that he could not read at all. There was no loss of consciousness, no premonitory symptoms whatever, excepting the sensation of numbness in the left leg and foot. His intellect was perfect, his memory was unaffected, and his special senses, excepting as regards the impairment of vision in his left eye and the anæsthesia on the diseased side, were natural. The bladder and rectum were at first normal, but after a while slight incontinence of urine followed.

"He remained in bed, unable to move, for about seven months before any change in his condition for the better took place, and then he began to improve, very gradually indeed,

and in time could go about by means of a crutch, which he continued to use for nearly a year, the leg during this period making the most progress. Then he laid aside the crutch and managed to walk with a cane, and in the due course of events he was able to move about without any artificial support, and has for the last seven years used nothing whatever to assist him in walking. During the early stage of the disease there was some amendment in the arm, but latterly there seems to have been none whatever. He has passed through the hands of many physicians, but without receiving much apparent benefit. While he was confined to his bed he had frequent nocturnal emissions, and, after he was able to be up and about, his virile power was abnormally exalted.

“About the middle of May, 1862, he commenced to have well-marked epileptic fits, which were attended with complete loss of consciousness and preceded by vertigo. These fits recurred at regular intervals twice a week for a period of nearly four years, when they began to decrease in frequency, although they did not change their type, as is often the case, and have continued to diminish until June, 1870, when he had an unusually severe attack, which was the last.

“The patient was admitted to the Out-door Department of the New York State Hospital for Diseases of the Nervous System, September 19, 1870, when the following points pertaining to his condition were at that time ascertained:

“His heart and lungs are perfectly healthy, general health is excellent, appetite is good; bowels are regular; urine is normal and there is no incontinence; vision on the left side is as good now as ever; the left pupil is slightly dilated or the right slightly contracted. The tactile sensibility of the whole left side of the body is diminished to a great degree; the motility is impaired, but this depends more on the lack of nervous energy than on atrophy or want of contractility in the muscular fibre. There is no facial paralysis, no difficulty in moving the tongue, no impairment of speech. His intellect and memory are as perfect as ever. There is no change of character, nor undue display of emotional feeling, which is so often evinced in those suffering from cerebral hæmorrhage. The tactile sensibility on the right side of the face is normal. Special senses,

excepting the anæsthesia of the left side, unimpaired at present. Sexual appetite is increased. On examining the eyes by the ophthalmoscope, they are both found to be in a perfectly healthy condition.

“Upper Extremity of the Left Side.—The arm hangs powerlessly by his side, with the forearm fully extended, and the fingers are drawn more or less into the palm of the hand. He cannot flex the forearm nor extend the fingers in the slightest degree, but can manage to raise the whole extremity a little by means of the deltoid muscle. The shoulder is depressed and inclined inward. There is some rigidity about the muscles of the fingers and hands, owing to secondary changes which have taken place. There is no observable atrophy of the muscles of the arm and forearm, and, as far as muscular development is concerned, they seem to be well nourished. The tactile sensibility is considerably diminished, while motility is greatly impaired, and to a much greater extent here than in the leg. The dynamometer indicates no expenditure of power, and this is evidently more on account of the inability of the patient to grasp the instrument, owing to the rigidity of the fingers, than from total want of muscular force. The sensations of heat and cold are diminished; tickling the palm of the hand is not felt, nor are reflex movements excited thereby. The sensation of pain is increased, as evidenced by the application of the electric current, while the same means shows that muscular contractility is diminished. The temperature is diminished, but sensations of deep pressure are increased.

“Lower Extremity of the Left Side.—The patient has considerable strength in this limb, and is able to walk about, yet he limps and has little control in directing its movements. The foot is strongly adducted, and the toe catches whenever he goes about, and when sitting down he is totally unable to raise the diseased limb voluntarily so as to cross his legs. Tactile sensibility, together with the sensations of heat and cold, is diminished, and so is temperature. Muscular contractility, as shown by the galvanic current, is diminished. Tickling the sole of the foot is not felt, nor are reflex movements excited thereby. Sensibility to deep pressure, pain, and electricity, is increased. There is a difference by measurement in the legs,

which shows that the left is an inch and a half the smaller in circumference."

The point of greatest interest in relation to this case is the alternate hemiplegia or cross-paralysis, in regard to the previous existence of which there appears to be no doubt. The arm and leg of the left side were paralyzed, the face was drawn to the same side, which of course shows paralysis of the right facial nerve. You know this is an exception to the general rule, which is, that the face and the rest of the body are paralyzed on the same side, and I therefore ask your especial attention to the circumstance. I have seen but two similar cases in the whole course of my experience.

And, first, let me recall to your recollection certain points in the anatomy of the seventh pair, or facial nerve, which is the principal motor nerve of the muscles of the face, and the one affected in cases like the present.

The apparent origin of this nerve is from the side of the pons varolii, although its fibres can be traced much higher up, even as far as the floor of the fourth ventricle. They decussate somewhere above the pons, the exact point not having been ascertained, and the fact being denied *in toto* by some anatomists. A point, however, which I shall mention to you presently, shows that the decussation does really take place, and that the crossing over must be above the pons.

After leaving the side of the pons the facial passes through the aqueductus fallopiani to the stylo-mastoid foramen, and is distributed to all the muscles of the face, excepting the pterygoid and the masseter. An extravasation of blood occurring in the pons on one side of the median line must paralyze the facial of the same side; so much for that division of the phenomena in this case.

The fibres of the anterior roots of the spinal nerves which are motor continue in the anterior columns, until they reach the lower part of the medulla oblongata, when they decussate, those of the right side passing to the left, and *vice versa*.

The fibres connected with the posterior roots likewise cross over to the opposite side of the cord, but they do so immediately after their entrance. Both sets therefore decussate be-

low the pons, and consequently a lesion of one side of this ganglion paralyzes both motion and sensation, on the opposite side of all that part of the body supplied by nerves arising below the point of decussation. But the crossing over of the facial nerves, as I have just told you, takes place above the pons, and consequently such a lesion must produce paralysis on the corresponding side of the face.

Now, the decussation, although difficult to see as an anatomical fact, is very conclusively proved by pathology, for an extravasation occurring in the corpus striatum of one side, for instance, paralyzes the opposite side of the body, face included, a fact which shows that the decussation of the facial has taken place below the seat of the lesion.

Another symptom present in this case indicates a lesion of the pons, and that is the epileptic paroxysms from which he has suffered. Although this phenomenon, if taken by itself, is not very definite, it is of importance when viewed in connection with the cross-paralysis.

And then a circumstance indicating the pons as the situation of the extravasation is the total loss of the faculty of reflex excitability, which you will recollect was especially mentioned in the history. Numerous experiments and observations serve to show that the pons is a grand centre of reflex action. Lallemand¹ mentions a case in which a child was born without cerebrum or cerebellum, and with no ganglion within the cranium excepting the pons varolii, and the medulla oblongata, and yet this child was able to suck, to make movements with its arms and legs, and apparently was possessed of as much muscular power as other children of its age. Many other similar cases are on record, and they certainly do show that reflex movements are not dependent on the higher ganglia of the brain for their manifestations.

This doctrine of cross-paralysis, pointing conclusively to lesion of the pons, is not universally admitted. Trousseau questions it on the basis of one case, in which the hemisphere was the seat of the extravasation, and I have myself seen one in which the hemisphere was apparently the only part of the

¹ Recherches anatomico-pathologiques sur l'encéphale et ses dépendances. Paris, 1824.

brain involved. Still a case or two should not be allowed to stand against the large number referred to by Gubler and Lays.

As regards the treatment of this case there is not much to say. The epileptic paroxysms seem to be gradually disappearing, the paralyzed muscles of the face have regained their contractility, and nothing remains to be done but to restore, as far as we can, power to the arm and leg. This we shall try to do by hypodermic injections of strychnia, in doses of a thirtieth of a grain every alternate day, and by the use of the primary galvanic current, until the contractility of the muscles is so far restored as to render the use of the induced current advisable.

[NOTE.—The treatment indicated above has been followed out in this case up to date, November 19, 1870, the patient every alternate day receiving a hypodermic injection of the thirty-second of a grain of strychnia, together with the application of the primary galvanic current to the paralyzed limbs three times a week. October 1st, the induced or Faradaic current having first produced contractions in the muscles of the forearm, hand, and fingers of the diseased side, this was employed from that date, in addition to the above means, as the conditions of the case demanded, sometimes one current being used, at others both. *October 31st.*—The tactile sensibility in both the arm and leg is beginning to return. In short, the improvement has been gradual and steady, and at the present time the condition of the patient is as follows: He can flex the forearm on the arm, touch his forehead with his left hand, flex and extend the fingers slightly. The toe does not drag, nor does he swing his leg very much. He can cross his legs without any difficulty. The foot is not adducted so much, and he can move it directly forward or backward, which he could not do two months ago. The muscles of both the leg and arm respond well to the Faradaic current, although muscular contractility is still diminished. The sensation of tickling is felt, but not so well as in the right leg, and the reflex excitability is abnormally impaired. Sensations of deep pressure, heat, and cold, are normal. Tactile sensibility has returned to a considerable degree. Sensibility to the electric

current is much increased. Temperature has increased. He has had no epileptic attack for five months, and his general health was never better than at present.—T. M. B. C.]

LECTURE III.¹

CONGESTION OF THE SPINAL CORD.—CHRONIC INFLAMMATION OF THE SPINAL CORD.—REFLEX PARALYSIS.

At the previous clinical lectures, I brought before you several examples of paralysis—cases due to cerebral hæmorrhage, to embolism, and to thrombus. The cases which I shall present to-day are examples of spinal paralysis; and I wish you to pay particular attention to the diagnostic marks which distinguish them from those you have before seen. I will first read the histories of the three patients before you:

CASE I.—“Rose Peyton, twenty-seven years of age, born in Ireland; mother of two children, both of whom are living; the elder has talipes valgus, while the younger is a fine, hearty child. Her family is very healthy, and there is no evidence of nervous diseases either in it or in any of its branches, so far as she is aware. The patient was a strong, active woman, and always did her own work until twelve weeks ago. In May there was a cessation of menstruation, and in July last she was seized with a deep, dull, aching pain in both legs, which appeared to her to be in the bones. There is no syphilitic taint in her history. There succeeded shortly after a severe pain in the back, which has continued up to the present time, but which has varied in intensity. Soon loss of motility, numbness, and anæsthesia, made their appearance in both legs, and in the course of two months she was totally unable to walk at all. At first her bowels were very costive, but soon this condition was superseded by incontinence of the rectum, which lasted for two weeks, varying in degree. There was also retention of urine. Sensations of formications, alternating with numbness, of heat and cold, of pricking by pins and needles,

¹ Reported phonographically by Dr. John Winslow.

were present not only in the feet and toes, but also in the hands and fingers. Patient noticed that, on rising in the morning, after a night's rest, her limbs were weaker, and that she had greater difficulty in moving about. The paralysis, after commencing in the lower extremities, rapidly extended to the upper. *August 25th.*—Was able to get out of bed for the first time in five weeks, and by means of a chair could move about a very little. Since then she had improved only so much as to be able to come to the Out-door Department of the New York State Hospital for Diseases of the Nervous System, by being supported by a person on either side, and only then with extreme difficulty. She was admitted September 22, 1870, when she was found in the following condition : Motility and tactile sensibility in both legs greatly impaired, but the right leg is the weaker of the two. Left hand, as measured by the dynamometer, is much feebler in power than the right, and this to a more marked degree than any normal disparity. Sensations of formication, alternating with numbness, of heat and cold, pricking by pins and needles, and tingling, still continue in the feet and toes, as also in the hands and fingers. Pain in the back increased by pressure and percussion, but no burning sensation of applying heat and cold. The anæsthesia is more marked in the thighs than in the legs. Soreness in the soles of the feet. Bowels constipated. Bladder normal. Electromuscular contractility and sensibility greatly diminished. No band around the waist. No spasms, twitchings, nor reflex movements in the legs. Pain in the lower extremities as at first. Changes in the degree of the paralysis from time to time. Temperature diminished. The circumference of the legs is diminished to a marked extent, owing to the atrophy of the muscles. Heart and lungs healthy. Urine not examined."

CASE II.—"Joseph White, thirty-two years of age, born in Ireland, blacksmith by occupation ; father of four children, all of whom are at the present time alive and well. He has never had syphilis, nor in fact any disease since his childhood. At times he has drunk to excess, but not habitually. His family line is free from the neuroses. The patient was a strong, hale man, having enjoyed the best of health, and always working

very hard and diligently at his business, until the 12th day of August, 1868, when he slipped and fell, striking the right side of his forehead at the outer canthus of the right eye against the edge of a tub, inflicting a severe lacerated wound. This remained open two months, and before healing was attacked with erysipelas, which was very severe and lasted a month. As soon as the erysipelas disappeared the wound of the face began to granulate and was quickly cicatrized. During this attack the patient was a greater part of the time confined to his bed. October 12, 1868, went to work as usual, and noticed that his hands trembled very much, and was every now and then seized with a severe attack of vertigo. His vision was more or less impaired, but in the course of a month was the same as ever. There was no loss of consciousness nor any involuntary muscular contractions during these seizures. He continued in this condition until July 1, 1869, when he was suddenly taken with a dull, aching pain in the lumbar region of the spine, which lasted for four weeks, and disappeared under the continued application of blisters. At this time there were no spasms in the muscles of the back. His attention was next called to numbness in the great toe of the right foot, which gradually extended to the ankle, and in the course of two weeks the whole leg became involved. He now became aware that motility was diminished in the right lower extremity. His bowels became very constipated, and a second attack of pain in the back supervened, which was not so acute as the former seizure. This pain remained steadily for a period of five months. *January 1, 1870.*—Was troubled for the first time with retention of urine. His left leg now began to grow weak, and this loss of power gradually increased. There was no abnormal sensation of numbness in it, as in the right. He remained in this state of incomplete paresis for a short time only, as the disease made such rapid progress that in March he was just able to get about, by means of a cane, with the greatest difficulty and exertion. The right leg was more paralyzed than the left, and tactile sensibility was diminished only in the former. Severe spasms and twitchings in the muscles of both legs now set in, and his attention was soon called to sensations of heat and cold, formications, swellings of the calves

of the legs, and prominence of the superficial veins of both lower limbs. For three months he remained in about the same state. *June 1st.*—He began to improve in walking, but was troubled very much with severe pains in both legs, which were at one time darting, at another dull aching, and seemed to start from the joints. *September 1st.*—Had a feeling of constriction or band around the waist, which has continued to the present time. He has improved in walking very gradually since June 1, 1870. He applied for admission to the Out-door Department of the New York State Hospital for Diseases of the Nervous System, October 3, 1870, when the patient was found in the following condition: Motility impaired in both legs, but not to any very great extent. The left leg is weaker in muscular power than the right. Sensations of heat and cold, formications, prickings by pins and needles, in both limbs. Reflex power greatly exalted. Twitchings in both legs. Cord around the waist. Numbness in right leg. Retention of urine. Bowels constipated. Severe darting pains in the legs. Slight pain in the back not increased by pressure and percussion. No burning sensation along the spine by application of heat or cold. Tactile sensibility in both legs normal. Urine markedly acid. Cannot stand up with his eyes closed, for he immediately loses his balance. Cannot walk in the dark at all. His gait is peculiar, and is better appreciated by being seen than described. The remaining points of his condition at the present time are negative in character.

CASE III.—“Elbert Baxter, forty years of age, single, born in the State of New York; showman by occupation.

“The patient had been a very healthy man until the year 1859, when his present disease commenced. He has always been remarkably temperate in his habits; having been addicted to no excesses of any kind. He has never had syphilis, nor suffered from any spinal injury. His father was attacked with hemiplegia of the left side when sixty-three years old, and his aunt on his mother's side was paralyzed when fifty years of age. All his other relations were free, as far as he is aware, from the neuroses. In the year 1859, having passed a night where he was obliged to sleep in a very damp place, he was

soon after this exposure seized with a dull aching pain in the small of his back, accompanied with nausea and vomiting. A short time having elapsed, there followed, first, loss of vigor; and, secondly, incontinence of urine, which was soon succeeded by a slight weakness of the lower extremities. This paresis of the legs gradually increased during a period of about six months, when it became almost complete paralysis. In July, 1860, he noticed that he was unable to exert volitional control over his rectum, and, if he did not immediately attend to the calls of Nature, his fæces passed involuntarily. This condition lasted several months, and varied in degree according to circumstances. At this time he entered the Kilkenny Hospital, in Ireland, where he was treated for three months for what was there called the creeping palsy, but, getting no better, he went to London, and after remaining there several months under treatment he became dissatisfied, as there seemed to be no improvement in his condition, and, giving up all hope of cure, he travelled in different parts of Europe until 1861, when he returned to New York. From July, 1860, to 1868, he was in a nearly helpless state, and was only able to get about with the assistance of a strong cane, and even then with great exertion. During the year 1867 he had a very severe attack of acute pain, limited to the lumbar region of the spine, and attended with violent spasms of the muscles of the back, which recurred at intervals for the period of four days, and were excited by the least movement on his part. He now recalls similar seizures which had taken place at intervals a long time ago, but they were not so intense in character. In 1868, under a tonic treatment, he began to improve in walking, and on admission to the Out-door Department of the New York State Hospital for Diseases of the Nervous System, August 16, 1870, he was in the following condition:

“His right leg is not very much atrophied, while his left appears to be very well nourished. The muscles of the left leg respond very well to the induced current, while those of the right are not affected at all by it. The extensor muscles of the right leg are so greatly paralyzed that the patient is unable to raise the toe, and in consequence drags it along on the ground at every step. The right leg only seems to be involved,

yet there is difficulty in guiding the movement of the left, not on account of the want of motor power, but from the absence of muscular sensibility to direct it. Under these circumstances it is with great difficulty that he can get about, even with the assistance of his cane, and, as he walks, his right leg bends under him, giving it the appearance of being shorter than the left, while he hastens forward as fast as possible in order to maintain his equilibrium. The tactile sensibility is diminished on the left side, as shown by the asthesiometer, as high as the umbilicus, and exactly limited to that side. The sensibility to pain, to the electric current, and deep pressure, is impaired on the left side, while the sensation of tickling is unfelt. Differences of temperature are immediately detected in both legs. He cannot stand with his eyes closed, and cannot walk at all in the dark. The impairment of motility is confined exclusively to the right leg. The heart, lungs, and kidneys, are apparently healthy. There is incontinence of urine, with continual dribbling; the urine is very alkaline; the bowels are constipated; there is no stricture of the urethra, but atony of the bladder, with loss of sensibility of its mucous membrane. There is no pain in the back by pressure or percussion; heat or cold does not produce any burning sensations in any part of the spine; there is no feeling of constriction or band around the waist; there are no referred sensations whatever; there are no spasms in the legs. There has been no rapid nor gradual extension of the paralysis upward. There has been no sympathetic affection of the eyes."

"The treatment in this case has been a teaspoonful of Squibb's fluid extract of ergot, with fifteen drops of the tincture of belladonna, three times a day internally, and the application of the primary galvanic current to the paralyzed muscles every alternate day. From August 16th to October 5th his urine continued alkaline; it was examined very often, that passed on rising in the morning being the specimen generally tested. In order that no doubt should arise in regard to its reaction, his bladder was on several different occasions carefully syringed out, and the urine was then tested and found to be alkaline as soon as it was excreted from the kidneys. *October 6th.*—The urine was neutral, and on the 10th re-

markably acid, and it has continued acid up to the present time, November 21, 1870, although the patient is living under exactly similar circumstances as regards food and medicine. *October 10th.*—He passed a good, full stream, and did not dribble, owing to the beneficial effect of the belladonna. At this date the induced current, producing contractions in the right leg, was substituted for the primary galvanic. He has taken the fluid extract of ergot uninterruptedly up to the present time, but he ceased taking the tincture of belladonna. *October 18th.*—This patient has improved very much in walking since he first came under observation. He can at present move about quite readily without a cane, yet the right leg is still weak, and the toe occasionally catches as he walks. His gait is characterized by a peculiar manner of limping. The paralyzed muscles have considerably recovered their contractility, and respond beautifully to a weak Faradaic current. The urine does not dribble away, yet there is a desire to pass it more frequently than is natural. The legs are both well nourished, and measurement shows no difference in their circumference. Tactile sensibility, sensibility to pain, deep pressure, tickling, and the electric current, are now only very slightly diminished in the left lower extremity. There is no perceptible retardation in the transmission of sensitive impressions on either side, although there was on the left at the time of his admission.”

Now, gentlemen, you have here three examples of organic disease of the spinal cord, giving rise to paraplegia, as it is called. Paraplegia is sometimes spoken of as a disease, but I wish you to understand that it is merely a symptom of a diseased condition, existing most generally in the spinal cord, but by no means invariably. The fault may lie with the sciatic nerves, for example. You will readily see that, if both of these nerves should happen to be cut, there would be paralysis of both legs, or one form of paraplegia. Cases also are on record in which it has been caused by cerebral disease. Paraplegia is, therefore, but a symptom of some lesion of the nervous system, producing paralysis below the point of injury or disease, and we form our ideas of the situation according to the muscles,

and other parts of the body which are affected. Thus, sometimes the lower extremities alone are paralyzed; sometimes they and the bladder or its sphincter are involved; sometimes the upper extremities participate, and so on.

Among the affections of the spinal cord, commonly known as organic, there are three frequently met with, to which we shall confine our attention to-day, which have several points in common, and which at times are difficult to distinguish from each other. The first of the three is congestion of the vessels of the cord or its membranes; the second, inflammation of the membranes—spinal meningitis; the third, inflammation of the cord itself—myelitis. The cases before you illustrate two of these conditions: the first patient is in all probability suffering from congestion of the spinal cord; the second and third from myelitis. It is not always easy to distinguish between the two affections; indeed, it is probably impossible, in some instances, to say whether we have to deal with a severe attack of congestion of the cord, or a mild one of myelitis; though, as between slight congestion and severe myelitis, no doubt could arise. The rules of diagnosis laid down in the books serve well enough for typical cases, but will be found insufficient and unsatisfactory in the majority of those which come under your notice.

In Rose Peyton's case, you observe there is no sense of constriction around the abdomen. This sensation of "a cord around the waist" is considered a pathognomonic symptom of inflammation of the medulla, but the idea is not strictly correct. I have found the symptom in cases of very bad congestion, and I think also in one case of simple irritation of the cord. It is true, however, that the sensation is felt in almost every case of inflammation of the cord. It is probably due to muscular spasm; and it indicates the upper limit of the paralysis. In some cases where the sciatic nerve is affected, and there is no trouble whatever with the spinal cord, we have a similar sense of constriction in the thigh, as if the limb were encased in armor. It is seen, not very rarely, in certain cases of sciatica, attended with loss of power.

You observe, too, another point. This patient has had no spasms or twitchings of the limbs, none of those aberrations of

motion so exceedingly common in myelitis. These spasmodic twitchings indicate irritation of the gray substance of the cord ; or rather, whenever you see them you may be very certain that the gray matter is in some way involved ; and it is not likely to be involved in congestion, unless this should become extreme, and enlarge the vessels to so great an extent as to exert very considerable compression upon the cord-substance. The twitchings depend strictly upon irritation of the gray matter ; and this ordinarily happens only when the cord is inflamed, or subjected to pressure.

The woman has had trouble with her urine. This you find in all three conditions—congestion, meningitis, myelitis. In the last you are more apt to have retention ; in the first, incontinence ; but you may have both in either condition. Incontinence depends simply upon paralysis of the sphincter of the bladder, retention upon paralysis of the bladder itself. The bladder, as you know, is a hollow muscle deriving its nervous supply from the spinal cord, and the act of urination is due to its contraction, the sphincter being at the same time relaxed. If the cord is inflamed, or otherwise disordered at or above the point where the vesical nerves are given off, we shall have paralysis of one or the other of these sets of muscular fibres, or of both ; for we may have both paralyzed together, the patient being unable either to retain his water or to expel it completely, and then the urine dribbles slowly off.

You find alkalinity of the urine laid down as one of the signs pathognomonic of myelitis ; yet, in the case of White, the urine is markedly acid, although I have no doubt that he is suffering from inflammation of the cord, mainly of its posterior columns. The sign is therefore not invariably present, but it is very frequently. It may be that this patient will have alkaline urine by-and-by. The present acidity may perhaps be due to something in his diet. If a myelitic subject were taking mineral acids, for instance, they would be pretty sure to acidulate the urine. In another case which has been shown you, and which is now in hospital, of myelitis, complicated with cerebral paralysis, the urine is very decidedly alkaline. It may happen that the urine is found alkaline when the cord is perfectly sound, the alkalinity depending

directly upon paralysis of the bladder (or upon any other affection, as enlarged prostate, which prevents its complete evacuation). The small portion of urine remaining in the bladder after each act of micturition becomes decomposed; and by contact with this and with the vesical mucus, the normal urine, as it enters the bladder, is also speedily decomposed and rendered alkaline. But in myelitis the urine is secreted by the kidneys in an alkaline condition, and it is this which is the diagnostic feature. To make a proper examination in case of doubt, the bladder must be thoroughly evacuated, and well washed out with lukewarm water slightly acidulated, and then the first urine that flows must be taken for testing.

In the case of Baxter this course was pursued, and the fact was demonstrated that the marked alkalinity observed was an inherent quality of the urine as excreted by the kidneys. Neither White nor Baxter can stand with his eyes shut and his feet close together, and neither can walk in the dark. The text-books speak of these symptoms as absolutely diagnostic of locomotor ataxia, which is nothing more than myelitis affecting the posterior columns of the cord. The inflammatory condition subsequently degenerates into what is termed sclerosis, or hardening of the posterior columns. It used to be thought that locomotor ataxia was an affection of the cerebellum; but no one at all conversant with the recent advances in its pathology now holds that view. It is simply inflammation of the posterior columns. But this inability to stand or to walk without the aid of sight, is not indicative of any particular trouble of the cord, as until recently supposed; it merely indicates a want of sensibility in the soles of the feet, and may depend upon an affection of the nerves as well as upon a central lesion. The sense of pressure is also much diminished in these cases, and, with this double insensibility, the patient requires all the help of his eyes and ears to get along. By looking at his feet, or at the ground a little in front of them, he can judge of their position, and manage to walk pretty well; but the moment he shuts his eyes, he does not know where his feet are, and so he falls. This is the reason, then, that a person having any disease of the posterior

columns of the spinal cord, involving their integrity, or any other affection causing loss of sensibility in the soles of the feet, and loss of the sense of pressure, cannot stand or walk in the dark; he has nothing to guide his muscular sense.

There is another point in Baxter's case which is exceedingly interesting. You will recollect that it is stated, in the history I have just read, that sensibility is impaired in the left leg, the motility being unimpaired, while motility is diminished in the right leg, the sensibility being unaffected. Now, if you will recall your anatomical and physiological knowledge, you will recollect that the sensory roots of the spinal nerves are in the posterior columns, and that they decussate soon after entering, and that the motor roots are in the anterior columns and do not decussate till they reach the lower part of the medulla oblongata. It follows therefore that in Baxter one lateral half only of the cord is involved, and the symptoms show that this is the right half, including the anterior and posterior columns of that side.

I had recently a patient affected with locomotor ataxia, living at the Fifth Avenue Hotel. He was able to walk quite well along the sidewalk, but he felt the greatest apprehension at crossing the street. This showed the loss of self-confidence which is strongly characteristic of these patients. They are indisposed to attempt any little gymnastic exercises which once they would have essayed without hesitation—though to cross Broadway through a jam of vehicles might be said to be a gymnastic feat that would tax the best of us. I once watched this gentleman for fully fifteen minutes trying to make up his mind to go across. He could not do it, though there were during the time many openings, when, but for this want of confidence, he might have crossed with ease. On one occasion, coming down-stairs at the hotel, he did tolerably well until he got to the bottom step; then, putting his foot upon the marble pavement, he became suddenly alarmed at its slippery character; fell upon his hands and knees, and called aloud for help. I have often seen these patients, while crossing my own hall-floor, suddenly stop and settle down into a sitting posture. This lack of confidence, which is so marked a characteristic

of the ataxic patient, has not, so far as I am aware, been mentioned by any writer upon the subject.

Anæsthesia is met with both in inflammation and in congestion of the spinal cord, though I think more frequently in inflammation than in congestion ; and you find it in both of the cases we have been examining. You may also have hyperæsthesia in these affections. After a time, if the inflammatory process goes on unchecked, these sensations cease ; they cease, too, if the patient is getting cured. In the former case, as the disease advances, *ramollissement*, or softening of the cord, takes place, and it is no longer capable either of giving rise to, or of communicating, any sensation ; the feeling of numbness, therefore, disappears, and with it goes the twitching of the muscles. In treating cases of myelitis, then, you must be on your guard against misinterpreting this into an evidence of convalescence when the patient is really getting worse. The other symptoms will, of course, settle the point.

It very generally happens, in cases of meningitis especially, that a prominent symptom, which may be regarded as quite characteristic, is the permanent tonic contraction of the flexor muscles of the limbs. In extreme cases, the heel is drawn up so as to touch the buttock, and the knee so as to touch the chin ; more commonly, however, the flexion is not thus complete. I have seen a number of these cases, and have had several recently under my care. One of them, a very prominent merchant, in Grand Street, came to me about a year ago, with such violent contraction of the limbs that the leg was exactly parallel to the thigh, and the thigh bent upon the chest, the heels against the glutæi, the chin resting on the knees. When I first saw him he had been in that position for several weeks. In another very severe case, that of a gentleman from Ohio, the same position of extreme flexion had been maintained for several years. I succeeded in curing the disease entirely, but it was impossible to bring down the legs. The muscles, from long contraction, had become so shortened, that no reasonable degree of force could overcome their resistance. So I called in my friend Prof. Sayre, who cut the tendons of the gastrocnemii, of the iliæi, of the tensores vaginæ femorum, and some others, and then forcibly stretched

out the limbs. Even the skin had become so contracted that by this extension it was ruptured in the popliteal space, making a gap three inches wide. But, in spite of all this, the limbs would not stay down. The patient could not bear the fatigue of having them stretched by the weights which were applied, and the attempt had to be given up.

In that form of myelitis involving the posterior columns of the cord, it often happens that one of the first symptoms noticed is some disturbance of vision; generally that the patient sees double. This is due to paralysis of some of the orbital muscles. There may be simple ptosis, from paralysis of the levator palpebræ superioris; but more commonly some of the muscles which move the eyeball are affected, and double vision necessarily results. This symptom often comes on early, and then soon disappears. It is dependent upon the intimate connection between the spinal cord, the sympathetic nerve, and the muscles moving the eyeball—the sympathetic having connection with every spinal nerve, and transmitting the abnormal influences thence derived to the muscles. So with all the head-symptoms which we find in this disease—and they are often very grave; I have seen cases approaching idiocy—they all result from the effect on the brain of the connection of the sympathetic nerve with the diseased spinal cord.

Before pursuing this subject further, let me present to you this patient who has just come in, and of whose case we have no written history. The gentleman, Mr. Atkin, is a teacher, about forty-five years of age. It seems that he served in the army; at Petersburg was much exposed to the weather; had an attack of fever of some sort, attended with great exhaustion; and when he recovered found that he had to a great extent lost power over his legs. He now walks with much difficulty, and in a cursory view you would probably observe no marked difference between his gait and that of White, although there is a difference which study of the subject would lead you to notice. From the examination I have been able to make, I cannot discover that he has any organic disease of the cord. He is probably suffering from what is called reflex paralysis, an affection which may result from trouble of the bladder, from worms in the intestinal canal, from diphtheria, ty-

phoid fever, and probably various other diseased conditions. It is most likely immediately dependent upon a deficiency of blood in the cord, though this point is not yet settled. In that case the anæmia of the cord may be due to disorder of the sympathetic nerve. The name reflex paralysis is a bad one, but it is in common use, and I will not burden your memory with any other. This patient has no muscular twitchings, no anæsthesia or numbness, no loss of power, no difficulty with his urine, no sensation of constriction about the belly. These are in brief the characteristic marks of reflex paralysis—they are simply negative. The diagnosis depends upon the absence of the symptoms of the organic affections which I have brought before you.

Too often, from fixing attention on the single symptom of loss of motive power, these diverse affections—myelitis, meningitis, congestion, reflex paralysis—are confounded with each other, all mixed up in the so-called disease, paraplegia. How great the distinction is you will at once understand. In this last case there is no serious trouble of the cord, nothing which cannot almost certainly be cured. In the other cases, although there is a very strong probability that these particular patients will get well, the prognosis is by no means so favorable. In organic lesion, those who get well out of a hundred can be counted on the fingers of one hand; in reflex paralysis, ninety-nine out of one hundred recover.

I have said enough to indicate the main principles which should guide you in your diagnosis of these forms of paralysis, and have given a slight idea of the prognosis. We come now to the treatment. And here there is the utmost possible difference in the management of the two categories of paraplegic affections. In the organic lesions myelitis and meningitis (as well as in congestion) the indications are to diminish the irritability of the cord, and to lessen the amount of blood in it; in reflex paralysis, on the other hand, the indication is to increase its excitability, and to this end its blood-supply. Now, if you institute a given treatment for paraplegia, and apply it indifferently to the two classes of cases, you will be quite as likely to harm as to help your patients—indeed, you may do them irreparable damage.

It is a fortunate thing that the treatment of myelitis, meningitis, and congestion, is essentially the same, so that even where you are in doubt regarding the diagnosis, as between these, you need not hesitate as to your principles of action. The measures of treatment may be divided into the external and the internal.

Of the external means I give the first place to dry cups, applied every night, or every alternate night, on either side of the spine. Blisters I have long since given up, as I think they only do harm. The cupping tends, of course, to divert the blood from the cord to the superficial vessels.

Another means of abstracting blood from the cord was brought prominently to my notice by the case of the Grand Street merchant before mentioned. He had in years past suffered much from bleeding piles, which had been operated upon and cured. At about the turning-point of my treatment of the case, the piles reappeared. One night they bled profusely, and the next morning I found the patient very much better. He had had no twitchings in the legs during the night, and had not been compelled to tie them to the foot-posts of the bed—a proceeding which had till then been necessary to prevent their getting drawn up to his chin before morning. The pain in the cord, too, had greatly diminished, and he had gained considerably more power over the bladder. Acting upon this hint, I applied a number of leeches to the verge of the anus, and kept on leeching him thus about once a week, with the greatest possible benefit. I afterward found two cases on record where congestion of the cord had apparently been cured by profuse hæmorrhoidal discharges. I have since very frequently in these cases employed leeching at the margin of the anus, in addition to the dry cups over the spine, and I recommend it as a valuable part of the treatment.

Another excellent revulsive means is the alternate application of heat and cold over the spine. Take a lump of ice and wrap it in a thin towel so as to hold it, and have at hand a basin of hot water and a sponge. First draw the ice three or four times down the spine; then do the same with the sponge of hot water; and so on alternately for five or six minutes. Do this every night or every morning, as most convenient.

By this means the skin becomes very red ; the irritability of the cord is much lessened ; and there is almost always effected a very marked alleviation of the symptoms.

The only further external means of treatment which I have found useful, is the application of galvanism to the spinal column. I place the positive pole above, the negative pole below, thus passing the current from above downward, and let it flow about five minutes, at the longest. The induced current, also, is of great value, not in curing the spinal affection itself, but in counteracting its effects upon the muscles. In the history of Rose Peyton you find it mentioned that the muscles of the legs are greatly atrophied. This atrophy is very common, depending on disuse of the muscles and insufficient nervous supply to keep up full nutrition. By persistent faradization you may restore these wasted muscles nearly or quite to their normal size and functional power, thus putting them in condition to respond to their proper nervous stimulus, if you should succeed in restoring that.

Of the internal means of treatment there is little to be said. There are only two or three medicines that are really of use. The first of these is ergot, in large doses. I have commonly used either Neergaard's tincture, or Squibb's fluid extract ; but of late I have taken to using the drug in substance freshly powdered, and I think it acts, perhaps, better in some cases than either of the preparations I have named. Of the fluid extract I give about one fluidrachm three times a day. This dose is said to be equivalent to about one hundred grains of the powder, but this must be a mistake ; for I find practically that I get about as much effect from thirty grains of the powder as from a fluidrachm of Squibb's extract. I give these large doses because the small ones of the text-books have no appreciable effect. You will sometimes be warned by druggists, who know nothing about the matter, and by physicians, who ought to know something about it, that such doses will cause gangrene. Now I suppose there is not a single authentic case on record of gangrene resulting simply from the use of ergot. Gangrene occurs, it is true, in those countries where ergotized rye is used as food ; but it is due not to the presence of ergot, but to the absence of fresh meat and almost every

thing else from the dietary of the poorer classes; it is the result of starvation. I have talked with those who have lived in those countries, and they say that the stories of ergot-poisoning are wholly the result of sensationalism or of ignorance, and can never be traced to any trustworthy observation. My friend Dr. Jacobi, formerly resident in such a region, pronounces the accounts all a fabrication. You may, then, safely give of the fluid extract, or the tincture, doses of one or two fluidrachms, the latter being the highest I have ever given. Of the freshly-prepared powder, the highest dose I have given is sixty grains; you may usually give it in twenty- or thirty-grain doses three times a day. There is no other one remedy so useful as ergot in these inflammatory or congestive affections of the cord or its membranes; and, as soon as you have determined that you have such an affection, you should give it at once, without fail and without hesitation.

Another useful drug is the iodide of potassium, which I also give in large doses. If, as is not rarely the case, there be any syphilitic taint, this may be combined with the bichloride of mercury in doses of one-sixteenth of a grain. The iodide I commonly give in commencing doses of seven grains three times a day, increasing each dose by one grain daily until I reach, say, forty-five grains three times a day. The most convenient mode is to make a saturated solution in water, containing a grain to the drop, and then measure the dose by drops. In the case of the gentleman from Ohio with contracted limbs, I got as high as sixty-drop doses before I stopped, and, as the patient had syphilitic infection, I used also the bichloride of mercury.

Belladonna has been strongly recommended for these affections, especially by Brown-Séquard. I have never found it of service, except in those cases where there was paralysis of the sphincter of the bladder; there, however, it is of great value. You may give the tincture in the dose of twenty drops three times a day. By a mistake of mine, a patient with paralysis of the vesical sphincter took in one day three doses of a fluidrachm each. It effectually closed up his bladder, so that he needed something to open it; but I would not advise you to repeat this dose, for it also produced the toxic effects of the drug.

Nitrate of silver is used principally where there is disease of the posterior columns of the cord. It is best given in pill, in doses of one-fourth of a grain three times a day, and must be continued for three or four weeks before you can tell whether it is doing good or not.

These are the chief means of treatment for the congestive and inflammatory affections of the spinal cord. Now, now, shall we treat reflex paralysis? As I have before said, upon just the opposite principle. Our main reliance is upon strychnia, which increases the irritability of the cord, especially of its anterior columns, increases its circulation, and improves its nutrition. It is far best given hypodermically, a daily injection of one-thirty-second of a grain, under the skin, will do as much good as at least three times that amount given by the mouth. Of course, if you give strychnia to your congestive and inflammatory paraplegics you will only make them worse. In these it is productive of good only at a certain late stage of the disease, when the cure is pretty much assured, and we wish to improve the nutrition of the cord; and even then it must be given in small doses, say one-sixty-fourth of a grain, and carefully guarded by ergot. I think it is also allowable to employ it as a means of diagnosis when you first take hold of a doubtful case. A hypodermic injection of one-twenty-fifth of a grain will soon settle the question whether you have to deal with a reflex or an inflammatory paralysis. If the former, the patient will be helped by the experiment; if the latter, he will find all his symptoms aggravated, but there is little probability of any serious injury from the single dose, and you have thereafter your course of treatment clear.

LECTURE IV.¹

LEAD-PARALYSIS—CHOREA.

THE first case which comes before us to-day is one of lead-palsy, and the following is its history, as prepared by Dr. Cross:

Paralysis from Lead-poisoning.—"Michael Coffy, aged thirty-two years, single, born in Ireland, a painter by occupation.

¹ Reported phonographically by Dr. John Winslow.

“When a young man, had soft chancres and buboes, but gives no well-defined, rational symptoms of syphilis. He has been moderately temperate in his habits, and has always enjoyed very good health until 1863, when he was suddenly seized with a very severe attack of colic, which was preceded by great constipation of the bowels and loss of appetite. There soon succeeded nausea and vomiting of bile, accompanied by an acute lancinating pain in the epigastric region, which was so severe that the patient was obliged to lie flat on the floor, and press his abdomen strongly against that surface in order to obtain temporary relief.

“These symptoms continued off and on for a period of about two weeks, gradually diminishing in severity, however, especially after an evacuation from the rectum, which was only obtained with the greatest difficulty. Subsequently the patient had cold, clammy perspirations, and was much debilitated; his right leg at this time became very œdematous. In the course of two months he resumed his usual avocation, that of a painter, but was not aware at this time that his sickness had been caused by the action of lead. During the year 1867 his bowels again became very costive, and his stools, which consisted of only a few lumps of dry, hardened fæces, were attended with much pain and straining. Soon there followed a second attack much more severe than the first, which was characterized by nearly similar symptoms, only there was superadded great tenderness over the kidneys, which were so sensitive that the least pressure caused him the most intense agony. The urine was very scanty and high-colored, and there was a well-marked blue discoloration of the gums.

“In a few months, having somewhat recovered, he went to work again at his former occupation, which he pursued uninterruptedly until the 25th of December, 1869, when, after having passed a very uncomfortable day, his former symptoms returned with increased violence, while the paroxysms of colic came on at much shorter intervals than they had done in the preceding seizures; in fact, instead of intermissions as formerly, there were only remissions of the intestinal spasm. For the first time, he had pain in the feet and the inside of his

thighs. The urine was more scanty and higher-colored, and the bowels more constipated than before.

"In three weeks he again began to work, and had no more trouble except constipation of the bowels, and weakness in both his upper and lower extremities, until July, 1870, when he lost his appetite, and felt very weary and exhausted after any small amount of exertion. He was very restless and could not sleep at night, and this inability to sleep was a sequela of all the other seizures. Now came great tremor of the right hand and arm, which was soon followed by tremor in the left. In August, 1870, he had his fourth and last attack, which was the most severe of all, and lasted about two weeks. This time he vomited blood, had acute pains in the soles of the feet, and cramps in the right hand.

"On recovering from the immediate effects of the colic, he found that he was unable to use his arm or hand at all, and that he had lost power in his legs also. Soon after this he was admitted to the Charity Hospital, where he remained for a fortnight, and during his residence in that institution he became delirious, and continued so for about eighteen hours.

"He came to the Out-door Department of the New York State Hospital for Diseases of the Nervous System, September 12, 1870, when his condition was as follows :

"There was the characteristic dropping of both wrists, which was very extreme in degree. The paralysis of the supinator and extensor muscles of both upper extremities was exceedingly well marked ; the flexors were also involved, only to a much more limited extent. The paralysis was more considerable in the right and forearm and hand than in the left. There was much atrophy of all the muscles of these parts, and this was very conspicuous in the abductors and adductors of the thumbs. The patient was so weak in his lower extremities, that he was unable to arise from the sitting posture without assistance, and as he walked he tottered at every step. Yet, he did not drag the toe of either foot, nor swing his legs, as do those suffering from hemiplegia. The blue line was very plainly seen around the edge of the gums of the upper and lower jaw. On testing the amount of muscular power in the right hand by means of the dynamometer, he was

able to turn the indicator only 10° , while with the left he could accomplish somewhat more. The tactile sensibility, sensibility to the electric current, and to pain, were very greatly diminished. The temperature was also diminished; muscular contractility was so much impaired that a powerful induced current had not the slightest effect in causing contractions, and even when the primary galvanic current (sixty cells and very strong) was used the muscles only responded very feebly, if we except perhaps the flexors, so almost completely had their irritability been destroyed. The bowels were regular, the urine was normal, and, although no chemical analysis for lead was made, undoubtedly it would have been found.

“The appearance of the patient was anæmic, cachectic, and depressed; the breath was very offensive; the retinæ were anæmic; the lungs were healthy, and so was the heart, excepting an inorganic murmur at its base.”

[NOTE.—The treatment in this case has consisted of the internal administration of the iodide of potassium, commencing with ten-grain doses three times a day, and the daily application of the primary galvanic current to the paralyzed muscles, with a hypodermic injection of the thirty-second of a grain of the sulphate of strychnia every day.

September 17th.—The iodide was increased to fifteen grains three times a day.

September 24th.—Slight fibrillary contractions in the right arm were produced to-day for the first time, by means of the Faradaic current. *October 1st.*—The iodide of potassium was increased to twenty grains three times a day. *October 5th.*—The induced current had just commenced to cause slight contractions in the left forearm.

November 15th.—Faradization of the left forearm produced good contractions in the extensor corpi radialis and ulnarius muscles. The blue line having disappeared, the iodide of potassium was discontinued, and a tonic substituted.

November 23d.—The muscles of both arms respond feebly to the induced current, yet by means of it the hands can now be extended nearly on a level with the forearms. The right arm has improved the more. Sensibility to touch and to electricity has much improved. His bowels are regular,

he sleeps well, and his appetite is good. The power in both hands has much increased, and he is able to work every day, although he is still under treatment.—T. M. B. C.]

On a former occasion I gave you some idea of the phenomena attending paralysis from lead-poisoning; and in my remarks upon the application of electricity to the treatment of diseases of the nervous system I called your special attention to its efficacy in this disease.

The pathology of the affection is not very clearly understood. One theory is, that the paralysis is due to the lead being brought into actual contact with the muscles, and deposited in their tissue. There might seem to be something to bear out this idea, in the fact that the loss of power is commonly greatest in the right hand and arm, which, in the case of painters and other workers in lead, are probably more exposed than the left to contact with the metal. But to this an opposing argument, which, I think, cannot be overturned, is presented by the fact that some of the worst cases of lead-paralysis are due to the use of saturnine cosmetics; and yet in these cases, just as with the painters, etc., it is the extensors, generally those of the upper extremities, that suffer.

An aggravated instance of this kind I lately saw in consultation with Dr. Sayre, in the case of a lady from Kansas, who had for a long time been accustomed to apply "Laird's bloom of youth" to the face and neck. Now it stands to reason that if the paralysis were due to the contact of the lead with the muscles, it should have affected chiefly those of the face and neck; but of this there was no sign. Take another example. I was consulted regarding a lady in Connecticut, who had paralysis strictly confined to the extensors of the wrists. I found that she, too, had been accustomed to the use of a lead-cosmetic, and also that the drinking-water was conveyed a long distance to the house through a lead pipe.

It cannot be, then, that the paralysis affects by preference the muscles of the hands and arms, simply because the hands are more exposed to contact with lead. Indeed, if that were the case, we should expect the flexors to be paralyzed rather than the extensors, for it is the palms of the hands that do the

handling. All we know of the matter is, that lead, introduced into the system by whatever channel, will produce, in some unexplained manner, a certain train of symptoms, among them lead-colic, which is probably only spasm of the intestinal muscles, and paralysis of the extensors of the arms and hands, and in extreme cases also of those of the lower extremities.

The only form of lead capable of producing these toxic effects would seem to be the carbonate. Metallic lead may appear to do so, but that is probably because it is so readily oxidized, and then converted into the carbonate. I do not think that the acetate is poisonous as such, yet some persons have been poisoned by taking it in large amount—a result probably due to its change into the carbonate in the alimentary canal.

Lead finds various avenues of access to the system, as you have already inferred. It may enter by the skin, the lungs, or the alimentary canal. Its effects are most frequently seen in painters, who handle its oxide and carbonate, and probably also inhale more or less of them. Lead, as you know, is the basis of nearly all our paints, zinc taking its place only for certain in-door decorations not required to stand the weather. Next in frequency among its victims come the workers in metallic lead. I have seen a number among the shot-makers, and the makers of bar-lead; and I have already brought before you two cases of this paralysis in type-setters. Lead-miners are very apt to suffer, and so are lead-smelters, who breathe its fumes.

For water to become poisonous by being brought through leaden pipes, or by standing in leaden reservoirs, it is necessary that it should be quite pure. In that case it will readily become impregnated with lead, and its use for drinking or cooking may be very dangerous. Some years ago I lived in a house where the washing-water was supplied from a lead-lined cistern, filled by rain-water from the roof. I made frequent analyses of this water, and sometimes it contained as much as $4\frac{1}{8}$ grs. of lead to the gallon. On a clear day I could even see the little metallic particles floating about in a precipitating-glass. This, bear in mind, was rain-water, and so, very pure. But with ordinary spring or river water there is comparatively little danger, unless it be allowed to stand a

long time in the pipes. For the generality of such water contains salts, especially sulphates, which form with the lead an insoluble coating for the inside of the tube, protecting it from further action. It is not safe, however, to rely upon this without an analysis of the water; and in any case it is not safe to drink water that has been standing long in the pipes. In the case of the lady just mentioned, the water was brought to the house from a very pure spring, so pure that neither baryta-water nor nitrate of silver gave any precipitate of sulphate or chloride.

In England, a few years ago, the family of the Prince de Joinville were all poisoned by lead, owing, as it was found, entirely to the water used, and which contained not one grain to the gallon. I have met with some similar cases in this city, but always from the use of water that had remained long in the pipes—for the Croton is not so remarkably pure as to become dangerous when it is being constantly drawn. These cases have occurred mostly in persons employed about schools or factories, where the water would be standing unused over Sunday, and in the former over Saturday also. You know that ale and beer, when not drawn directly from the cask, are commonly conducted to the fountain through lead. I had a curious case of lead-poisoning, which for some time puzzled me, in the wife of the proprietor of a beer-saloon. There seemed to be no source of lead except the beer-pipe; yet the family, which was German, all drank beer, and why should this member suffer and the others escape? The mystery was solved on learning that it was her habit, every Monday morning when she came down to open the saloon, to draw off first a couple of glasses for herself. In accordance with the excise law they sold no beer on Sunday, so that she got the full benefit of what lead the beer in the pipe would dissolve from Saturday night to Monday morning. It gave her lead-colic, and afterward lead-palsy.

Look, now, at the patient before you. Although he has improved under treatment, yet you see the characteristic "wrist-drop" very strongly marked. With the hand prone you observe that it hangs down powerless; he cannot extend the hand so as to bring it on a line with the forearm. There is

only a slight tremulous motion when he makes the effort. Even the strong induced current which I am now applying to the extensors on the right forearm, fails to make them contract. The flexors, too, are much enfeebled, although they respond slightly to the current, so that when I place one sponge on the front and the other on the back of the forearm, they flex the thumb and fingers a little; for the extensors, though traversed by the current, cannot oppose them. All the other muscles, even those of the upper arm, have suffered from long disuse. I now pass the current directly through the biceps, and it comes up but partially and with difficulty. Now let us try the electrodes on the back of the left forearm. The extensors are not so badly off as on the right; I can feel and see them rise up a little under the electric stimulus, but not enough to lift the hand.

The loss of power in the flexor muscles of the fingers may be best exhibited by the little instrument I show you here—the dynamometer. It is simply an elliptic spring, of a size to be conveniently grasped by the hand, and having an index to show the amount of compression effected. It measures with the utmost accuracy the degree of grasping force. You see that this patient's greatest pressure suffices only to move the index ten degrees; it would hardly kill a fly! You note also, from the position of the hand, that the flexor carpi ulnaris is more seriously paralyzed than the flexor radialis. This little piece of mechanism I commend to you as exceedingly useful. By no other means can you form so accurate an estimate of your patient's condition, or follow from day to day the almost imperceptible steps of his progress toward improvement or the reverse. To tell the patient to squeeze your hand is a very crude method. You could not judge by it whether he was able to move this index fifteen or twenty-five degrees. Without the graphic attachment, the instrument is very cheap. This attachment—the dynamograph—which I now place in position, is essentially the same that you have been longer familiar with in Marey's sphygmograph. The index of the dynamometer has a pencil affixed to it, its point resting against a card laid upon this rectangular brass plate. By winding up a spring I set in operation a clock-work which moves the plate

and card along past the pencil-point at a perfectly uniform rate. If by an unvarying degree of compression the index and pencil are held stationary, the latter will of course make a straight mark upon the card; but if the pressure varies, its irregularities will be faithfully recorded in corresponding irregularities of the trace. This tests, therefore, the patient's ability to maintain a continuous muscular contraction; it shows, not only the strength of his muscle, but the tone of his nerve. In certain cases of cerebral paralysis, as well as in some forms of spinal disease, its indications are of the utmost importance. Let us try it now upon the man we have been examining. The lever bearing the pencil starts at the height of ten degrees, the point, you remember, to which he raised it before; but it remains there hardly a moment. Now it is falling, falling steadily, and before the card has stopped passing, it has reached the bottom—the man's grasping power is utterly exhausted. Here you see a number of traces made by other patients—for I employ this instrument a great deal. In one set of them, made by a patient with cerebral paralysis, you note a marked difference between the early traces made by the right and by the left hand, and by following out the series you can watch beautifully the successive stages of improvement, until the lines become as straight as you or I could make them.

The prognosis in lead-paralysis is always decidedly favorable if you can get the muscles to respond at all to the induced current; and it is still favorable, though more time must be allowed, if they will respond only to the primary current. But if no response can be evoked by as powerful a galvanic current as it is safe to apply, then you may as well give up the case. As examples of the time required for cure in reasonably favorable cases, let me briefly cite a few from my case-book:

1. X. T.—No contraction from induced current. Primary current caused powerful contractions. Cure in four months.
2. W. C.—Very feeble contraction from induced current. Primary current caused strong contraction. Atrophy of all the extensors of the wrist, and adductors of thumb. Cure in six months.

3. J. B. H.—No action from powerful induced current. Primary current caused strong contractions in all the paralyzed muscles. Cure in two and a half months.

4. W. J.—Lead-paralysis, the result of using cosmetic containing lead. Extensors of wrist affected. No effect from strong induced current. Primary current induced strong contractions. Cure in three months and twenty days.

5. M. P.—Cosmetic. No effect from strong induced current. Strong contractions from primary current.

6. J. D., painter.—No effect from induced current. Strong contractions from primary current. Still under treatment.

7. C. N.—Contractions from induced current. Cure in six weeks.

8. P. C.—No contractions from induced current. Strong contractions from primary current. Cure in two and a half months.

In all these cases contractions were caused either by the induced or by the primary current, and I was therefore able to promise definitely that they would be cured. Where the affected muscles respond unmistakably, though feebly, to the induced current, you may safely say that under proper treatment their functions will be restored in a couple of months. If they will not respond to that at first, but only to the more powerful primary current, then you must date your two months for recovery from the time when Faradism begins to affect them. In the case before us, those muscles which you have seen contract under the Faradaic current will probably in two months longer respond normally to the stimulus of the will; but some of them, like the adductors and abductors of the thumb, are so far atrophied that it will take much longer than that for their nutrition to become fully established and restore them to their old size and strength.

The treatment has been already indicated in the history of this case. It is customary to begin it with the iodide of potassium, in order to eliminate the lead from the system; and I generally keep up this medicine until the blue line completely disappears from the gums, for until that is gone you may be pretty sure there is some lead left. In this man's case you see

it is fast going; the blue line has changed to a pale, whitish gray. The lead combines with the iodide to form a soluble salt, which is chiefly eliminated by the kidneys. You may find lead in the urine of these patients after giving the iodide of potassium. I give no other medicine than this, unless there be marked cachexia, when the patient may require tonics, such as quinine, iron, etc. For the rest you must have recourse to electricity. There is no way of treating these cases successfully except by this, in one or other of its forms. You may have removed all the lead from the system, yet the patient can move his muscles no better than before. To restore them to use they must be exercised; and to exercise them you must find a stimulus to which they will answer. This electricity affords. But you must be sure that you apply it in a form which will provoke their reply. In this man's case the Faradaic current at first caused no contractions; and you might have gone on applying this current daily for month after month and year after year, not only without curing the patient, but without even checking the progressive degeneration and atrophy of the muscles. The galvanic current of a pretty powerful battery was necessary to start the cure, and bring it to the point where the Faradaic could continue it. I have never yet seen a case in which the primary current would not produce contractions, but I suspect that, if this man had gone a year longer without its application, it would then have failed to elicit them, and the case would have been hopeless.

Chorea.—In this little boy we have an example of a disease which you will meet with far more frequently—chorea. He comes from the Out-door Department of the Hospital, where he has been under the care of Dr. Castle, who gives me the following history:

“Michael Prunty, aged ten years, born in the city, of Irish parentage. Applied for treatment at the Out-door Bureau of Bellevue Hospital, on the 4th of October, having had chorea since the 29th of June previous. His mother says that about the 19th of June he went four times during the warmest part of the day to bathe in the Harlem River, and that on his re-

turn home in the evening his face was swollen and the whole surface of his body congested. During the night he was delirious. The next night the fever and delirium were repeated. After this he appeared to be well, until the morning of the 29th, when, on getting up from bed, he had loss of power, and choreic movements of left side, and then told his mother that since the fever of the week before he had felt weak on the side.

“The choreic movements were at first limited to the left side, but had increased in severity, and, about a fortnight before coming to the dispensary, the muscles of the right side had commenced to twitch, and were becoming progressively worse. Could, by an effort of the will, control the movement of the right, and for a few moments those of the left side. Movements not interrupted during sleep. No impairment of sight, or strabismus. Hearing not affected, but for the first month following the attack heard noise of waves on left side. Was always easily angered, and since the attack is more wilful and peevish than before. The choreic movements of tongue prevent his talking much. Is awakened with difficulty when asleep.

“Digestion feeble. Has always been a dainty feeder, and would never eat fat meat or much butter. Has never had rheumatism. No hereditary tendency to disease of nervous system. Some of his ancestors have died of phthisis.

“Stethoscopic examination of chest is difficult on account of the twitching of the muscles, but no rigors were detected, disease, excepting irregular contractions of the heart. Urine passed in the morning neutral.”

The symptoms are not at present so well marked as I would be glad to have them for your sake, though for the boy's I can not well object to his having gone on so far toward recovery. He can hold out his arm and keep it pretty still, but the fingers are spasmodically extended, and now and then there is a sudden movement of flexion or rotation.

Regarding the pathology of chorea, we are in great uncertainty. We cannot even say what is the organ affected; some authors locate the disease in the brain, others in the spine.

cord, others again in the general nervous system. My own opinion is that, under the name "chorea," there are confounded two or three distinct affections, just as locomotor ataxia was lately confounded with several other diseases of the cord, and as almost all shaking palsies were, until two or three years since, called indiscriminately "paralysis agitans." My friend Dr. Ogle, of London, lately wrote a monograph upon "fatal chorea," and reported some fifty autopsies of such cases. The diseased action had almost always been confined to one side of the body, and the lesion was found in the corpus striatum. This was certainly a very different affection from the chorea which you may see almost daily in our dispensaries, and which almost always gets well. I believe that the ordinary chorea of children has its seat in the cord. At the same time it is very common to find it associated with mental symptoms more or less pronounced. The child is less bright than before, or it may even become imbecile; it shows aberration of disposition and will, and in place of its usual gayety it becomes peevish and fretful. This is what you would expect. In disease of the stomach or liver we often find the brain affected secondarily; and it is very rare that there is any serious disease of the cord without its producing this result. In older patients the mental symptoms are sometimes remarkable. I have now under my care a choreic young man who is often put in the most embarrassing positions by the fact that he cannot control his speech. He finds himself irresistibly impelled to say things which he would fain avoid, and this unfortunate tendency debars him entirely from the society of ladies. Whenever he meets them, he is sure to utter something to his own deep mortification. This has been his condition for several months. I knew a similar case in a wealthy gentleman of Harrisburg, who would be making a social visit and conducting himself with the utmost propriety, when suddenly he would jump up, stamp his feet, swear violently, and then, covered with confusion, make his escape from the house.

As to the causes of chorea, the disease has been commonly, and until very recently, supposed to be intimately connected with rheumatism. If I mistake not, I gave you that as my own opinion last year; but, as I have before warned you, I

often find occasion to change my views, and, if you come to these lectures, you must not expect always to hear the same thing. The theory of the rheumatic origin of chorea came into vogue mainly through the influence of Trousseau. He thought he had found it most frequently associated with the rheumatic diathesis, especially where this had produced disease of the heart; and his idea was, that the chorea was, in many instances, due to embolism of the arteries of the brain. Now, further investigation has shown that this is not the case—that none of the symptoms of embolism are present in chorea; and a very extensive study of hundreds of cases has convinced me that there exists no connection whatever between chorea and rheumatism. There are other causes, however, which none deny. Any thing which tends to depress the powers of the system—inproper food, bad air, want of cleanliness, etc.—may become a predisposing cause, and then almost any irregularity may determine the outbreak of the disease. Worms may excite it in young children. It may be brought on by fright, or other violent excitement, and this in persons who have appeared in perfect health and under good hygienic conditions. Some of the most interesting cases I have ever seen were caused by fright. Two or three have been due to over-study at school, which is, as you know, one of the means by which the powers of the system may be very materially depressed.

The prognosis of the disease as it occurs in children is almost invariably good. When I last looked at my table of cases, I had recorded accurate notes of sixty-eight, and of these only two had become confirmed. All the rest either were cured or got well, and even the two persistent ones may recover as the age of puberty comes on. The duration of the disease is generally about two months. That is just about the average of my cases. You can give your prognosis, therefore, with a good degree of definiteness, and so greatly encourage the child's parents or friends.

The disease occurring in adults is a totally different thing. In them you do not often find the choreic movements constant. I have in mind the wife of a prominent man of this city who has been subject to the affection for a long time. She will for

days seem perfectly well. Then, suddenly, she will whirl about on one toe for an hour, until completely exhausted. Again, she will have a spell of getting up and sitting down in her chair, with such force as to bruise the nates. At other times she will jump steadily until her strength gives out.

A few words regarding treatment. I have called attention to the fact that the children who are subjects of chorea nearly always get well. I do not think you can do much to render the recovery more certain, but you may most certainly do much to shorten its period. For the last two or three years my great reliance has been upon strychnia. I commonly begin by given one-sixtieth of a grain three times a day, and gradually increase the dose to one-twentieth. This has proved almost uniformly and quite speedily successful. Some of you will remember the boy brought here last year by my friend Dr. Lusk. He had been treated for months without benefit, but, when put upon strychnia, got well in two weeks. When I spoke of the average duration of the cases as being two months, I meant their duration not left to themselves, but put under judicious treatment.

If you see a case when it first comes on, you may cure it in ten days by the application of ether-spray to the spinal column. Strip the patient to the buttocks, and, with an atomizer, throw the spray all the way up and down the spine for about five minutes. Do this three or four times a week, or, in extreme cases, every day. From six to ten applications will usually effect a cure. I have never seen a case resist longer than two weeks. The method is not my own, although I am not aware that any one else has used it here. I found it lately in a German journal, and have now tried it in some eight or ten cases.

ART. II.—*A Letter to the Editor on Some Recent Contributions to Mental Science and Anthropology.* By GEORGE EDWARD DAY, M. D., F. R. S., late Professor of Medicine in the University of St. Andrew's, etc.

AMONG the most important of the recent contributions to mental science, in Great Britain, I must place an essay on

"The Psychology of Criminals," by Mr. Bruce Thomson, Resident Surgeon, for the last twelve years, to the General Prison for Scotland. It is virtually a memoir on moral insanity, based partly on Dr. Despine's "*Psychologie Naturelle*," and partly on his own large experience regarding "the characteristics of the criminal classes." As the text of this paper, Mr. Thomson cites the following passage from the introduction to Dr. Despine's book: "In reading, without any preconceived views, the reports of criminal trials, I was struck with the constant, recurrence, among those who had committed crimes in cold blood, of a mental condition marked by the absence of all moral remonstrance, before the act premeditated, and the absence, not less complete, of all remorse after the accomplishment thereof." After noticing the leading laws which (according to Despine) govern the normal state of the mind under the healthy guidance of the instinctive faculties, or the moral sense, and showing that defective and abnormal and anomalous states of the instinctive faculties exist in entire races, as the Bojesman and the Australian (in whom the moral sense seems totally absent, and who simply follow their own desires), and not only in these degraded races, but in the "moral idiots" that occur in the best races; and, lastly, that the moral nature may be modified by sex, and age, and religious training, Mr. Thomson proceeds to "offer some facts and figures bearing on the inquiry as to the psychology of criminals," and arranges his subject under the following heads: 1. The physical characteristics of criminals; 2. Their penal characteristics; 3. Their moral characteristics; and, 4. Their liability to brain-diseases, accompanied by intellectual as well as moral insanity.

1. Criminals form a variety of the human family quite distinct from civil and social men. There is a low type of *physique* indicating a deteriorated character which gives a family likeness to them all. The reason of this likeness is that the class forms a community which retrogrades from generation to generation. The low physical condition of the juvenile criminals seen at reformatories, etc., is at once obvious, if they are compared with the healthy, active children of ordinary schools. They are puny, sickly, scrofulous, often deformed, with peculiar, unnaturally-developed heads, sluggish, stupid,

liable to fits, mean in figure, and defective in vital energy, while at the same time they are irritable and violent, and too often quite incorrigible. The adults usually have a singularly stupid and insensate look, which often approaches to the diabolical. The color of the complexion is bad, and the outlines of the head are harsh and angular. The boys are ugly in features, and have a generally repulsive appearance. The diseases of criminals are a proof of their low type and deteriorated condition; their deaths being mainly due to tubercular diseases and affections of the nervous system.

The tendency to deterioration among associated criminals has been observed in great cities all over the civilized world. "What," asks Mr. Thomson, "is the cure? Improvement or abolition of the parent stock?" The first is out of the question in the case of criminals generally; and hence, on the Darwinian principle, that thoroughly bad animals should not be allowed to breed and thus deteriorate the stock, he recommends that incorrigible criminals, at the healthy, vigorous period of life should not be allowed to be at large. "Why," he asks, "should they go to prison for short periods only, to be sent out again in renovated health, to propagate a race so low in physical organization?" Considering the sentimental state of public opinion, this seems almost as impracticable a proposal as if he had suggested a certain surgical operation for the same object.

2. Criminals, as a class, exhibit a low calibre of intelligence. The young criminal is slow to learn, and the prison-teachers in Scotland—a class abolished since the establishment of reformatories—agreed in the opinion that more than one-third of the juvenile criminals were of imbecile mind, self-willed, and with few exceptions slow to learn. Of nearly six thousand prisoners, of all ages, observed by Mr. Thomson, twelve per cent. exhibited decided mental weakness, independently of those that subsequently became insane. Hence, in cases of prison offences, it is often difficult to judge regarding the responsibility of the criminal. When, as is very often the case, prisoners with no apparent motive conduct themselves like maniacs, destroying cell-furniture, breaking windows, and making murderous attacks on their fellow-prisoners, or the officials, without any obvious reason—when, in short, they exhibit an impulsive and

uncontrollable fury, how are they to be dealt with? Kindness and the most severe punishment are equally unavailing; and yet our law holds this class altogether responsible. Even epilepsy, which is remarkably common among criminals, is, in the eye of the law, no apology for crime; and moral idiots—for just before and after their fits they are nothing else—are regarded as common offenders.

3. The moral insensibility of criminals is chiefly demonstrated:

(a.) By the *frequent recommitments* of the habitual, and especially the female convicts—the thieves.

(b.) By the *apparent absence of all remorse* in high-class criminals, murderers, homicides, etc.

Mr. Thomson has made a special study, from 1855 (when transportation was abolished) to 1868, inclusive, of all the female prisoners in Scotland whose sentences varied from five years' imprisonment to confinement for life. They amount in number to 1,034, of whom there have been recommitted 458 who have suffered repeated sentences to penal servitude in the General Prison, as follows: 345 have been *twice*, 103 have been *thrice*, seven have been *four times*, and three *five times* convicted. Hence, these 458 convicts have been reconvicted 1,042 times. Again, each of these 458 women had on an average undergone at least four short sentences (some even fifty or a hundred) in local prisons before being sent to the General Prison, so that their total recommitments amount to 2,874, or about six for each woman. This class, it is to be feared, is hopeless and incorrigible; yet Mr. Thomson draws comfort out of these figures. Although the committals are numerous, the criminals are comparatively few; and, if the *habituées* were confined for life, the residue outside would be small, and the propagation of the class prevented. In further support of this view, he urges that, taking into consideration that each trial costs £30, that the average sentence is only for five years, and that the prison-keep is more than £20 per annum for each, the total expenses of these 458 habitual criminals for the space of five years cannot be less than £132,020. In other words, each of these criminals costs the country about £60 per annum, or about three times the sum that would be required for their permanent incarceration!

When Mr. Thomson entered on the duties of his office, he totally differed from the view lately advocated by Despine, that high-class criminals were totally deficient in the moral sense. His investigations during the last twelve years have, however, completely altered his original opinions. He has had charge of 240 male and 150 female criminal murderers, besides at least 40 who were found insane when they committed murder, but afterward became sane. In only three cases out of 440 murderers was there any evidence of regret or remorse. Besides the absence of moral sense, the want of manly courage and of confidence in each other, and a habit of universal lying, may be mentioned as the characteristics of this class; and nothing affords stronger proof of their moral insensibility than the fact of their not being amenable to the teachings of chaplains and other instructors. "Would not," asks Mr. Thomson, "life-confinements be at once a wise economy to the country and a mercy to the criminal?"

4. While in England and Wales there is one lunatic to every 432 persons, Mr. Thomson found that in 1869 there was one lunatic criminal to every 47 of the entire criminal population; and that, of the female class of habitual criminals, one in every 36 has become insane.

The chief corollary deducible from the statistics collected by Mr. Thomson is, that many, especially epileptics, who seem intractable in prison, and all who have been frequently re-committed, should be kept permanently in confinement. At the conclusion of his very remarkable paper he quotes Mr. Hill, for many years an inspector of prisons, and Prof. Laycock, as supporting his views regarding the possible extinction of the criminal classes.

Dr. Thompson Dickson, late Medical Superintendent of St. Luke's Hospital, has published a good practical paper on Puerperal Insanity, based upon a number of cases witnessed at the hospital. The practical conclusion at which he arrives is that "early treatment will generally be followed with happy results, and one essential of the treatment is removal from home influences." The personal treatment recommended is absolute rest, nutritious diet, and stimulants judiciously administered.

In a forcibly-written essay on *felo-de-se*, by Dr. Davey, that eminent psychologist, basing his argument on the analysis of a number of well-known cases, maintains "that the act of suicide is without exception the effect of preëxisting cerebromental disease; the mere effect of an antecedent cause." On these grounds he claims the repeal of the present law, which is not only unjust to the memory of the principal person, but punishes his heirs or representatives. The views contained in this paper, which was read at the late meeting of the Medico-Psychological Association, were strongly supported by many influential members.

Among the "Occasional Notes of the Month" in the October number of *The Journal of Mental Science* is a review of "The McFarland Trial." It is not written in a pleasant, genial spirit; and, if the reviewer had read Dr. Hammond's article on the subject, the general tone of the criticism would probably have been very different.

The proceedings of the Psychological Section of The British Medical Association at the late meeting at Newcastle were commenced by the reading of a paper on "How far can the Relations of the Mind and Body be investigated scientifically and practically?" by the president, Dr. Laycock. It is published in the *British Medical Journal* for August 27th, and does not readily admit of analysis. He likewise read a paper on "Epileptic Chorea," in which he advocated the use of bromide of potassium. Several members, in the discussion that followed the reading of this paper, quoted cases of epilepsy that had yielded to this remedy. The subject of "Syphilitic Insanity" was brought forward by Dr. Grainger Stewart; but, as his views were based on only three cases, it is scarcely necessary to notice them. While he held treatment as of no effect, Dr. Laycock advocated the employment of large doses of iodide of potassium (from ten to thirty grams) three times a day. Perhaps the most valuable paper, although it was somewhat deficient in arrangement, was Dr. Clouston's essay on "The Use of the Thermometer in the Diagnosis and Treatment of Insanity," based on observation in 580 cases. Its regular use, in the Carlisle Asylum, shows that the temperature of the insane arises from two causes: 1. Inflammatory affections; and,

2. Disturbances in the action of the central nervous ganglia. It is this second class of causes that requires special observation. The temperature of the body of the insane is higher than that of the sane; and the difference of temperature, according as a patient is quiet or excited, sometimes amounts to 5.8 degrees. The most marked characteristic is the rising of the evening temperature, which in the mildest cases is much higher than in health, and in general paralysis is as much higher than the morning temperature, as in health it should be lower. In relation to treatment, any drug that has the effect of bringing the temperature in the direction of health is indicated. In certain cases opium tends to raise an already too high temperature, while bromide of potassium will reduce it; and valuable indications as to diet, tonics, and stimulants, may often be obtained from the thermometer. General paralysis in its early stages can often be diagnosed from simple acute mania by the increase in the evening temperature; and the beginning of pneumonia or pleurisy, or the detection of injuries in patients with blunted sensations, may be often effected by this instrument.

I now proceed to notice some of the most important of the recent British contributions to anthropology. In this country anthropology and ethnology have become almost identical terms. Broca defines the former to be "that science which has for its object the study of the human group, considered in its *ensemble*, in its details, and in its relations to the rest of Nature," while the title is defined, by the Society which is specially devoted to its investigation, as "the study of the human race in all its varieties, and in all the phases of its history and progress."¹ The British Association has made "ethnology and anthropology" collectively a department of the Biological Section; and at the late meeting, held at Liverpool, Mr. Evans,

¹ In connection with this subject, I would refer to some excellent observations by Rokitsansky, on the development of anthropology in three chief directions, which nearly represent the periods of its development, viz.: 1. Man, studied in his physical and mental capacity. Founded on observations of one's own countrymen. 2. Those men of other races, customs, and manners (ethnology); and 3. The primitive history of man. (See *Journal of Anthropology*, July, 1870, p. 74.)

the president of the department, defined the subjects proper to be considered under these joint titles as—

1. All that relates to the antiquity of man, or the origin of the various races of mankind.

2. All that illustrates the progress and development of human civilization ; and,

3. All that concerns the condition of the less civilized portion of the human race, even if not immediately connected with any general question of its origin and progress.

As I shall not again recur to Mr. Evans's address, I may take this opportunity of strongly recommending it, as full of interesting matter, to all the readers of these pages. I may observe that, with regard to the antiquity of man, he thinks that "perhaps the most important evidence of all is that of the old river-gravel of Eastern Europe, which affords proof of the coexistence of man with the mammoth and woolly rhinoceros, at a time when the beds of the rivers were at an elevation of, in some cases, a hundred feet above their present level, so that the existing valleys must have been excavated to that extent since the days when these old river-drifts were deposited. . . . It is impossible in any way to see what other discoveries in the strata beneath us may yet have in store for us. I must, however, confess that the present amount of evidence of human existence in Pliocene and even in Miocene times, in France, appears to me to be very far from convincing. Should the remains of Miocene man be eventually discovered, it would be of the highest interest to compare his form with that of his contemporary and equal in stature, the *Driopithecus*, which was sufficiently human in habit to retain its wisdom-tooth still undeveloped in its jaw, after all its milk-teeth had been replaced by the second set."

In connection with Mr. Evans's first division, I may mention the following papers: 1. Sir H. Rawlinson on "The Site of Paradise," in which, basing his conclusions on cuneiform tablets found at Nineveh, and executed in the seventh century B. C., but copied from still earlier tablets, he believes that the site of the Garden of Eden was in reality the land of Babylonia. 2. Dr. Ginsburg on "The Relation of the Ancient Moabites to Neighboring Nations, as disclosed in the Newly-

discovered Moabite Stone," which was engraved nine hundred years B. C., and was therefore older than two-thirds of the Old Testament. He believes that at that date an organized temple service existed among the Jews out of Palestine, and that this service must have been akin to that used by the Moabites; that, 900 B. C., the word "Jehovah," which was afterward carefully avoided by the Jews, was then so generally employed that it passed over to the neighboring nation; that the language of the inscription, which is far more simple than two-thirds of the Old Testament, showed that the Moabites had attained to a high state of civilization; that in military prowess they were superior to the Jews; and that the ancient Greeks and Romans, as well as ourselves, had derived the germs of our alphabet from them. These papers were read at the Liverpool meeting. 3. *Prehistoric Archaeology* is the title of a review of "Flint Chips" (by Edward Stevens, pp. 593, London, 1870), in the October number of the *Journal of Anthropology*, and those who have not access to Mr. Stevens's very instructive volume will be able to learn the nature of its contents from this article. (The contents of the Blackmore Museum at Salisbury, on which it is based, occupy two hundred and fourteen cases, arranged in four groups, namely: 1. Remains of Animals found associated with Man. 2. Implements of Stone. 3. Implements of Bronze. 4. Implements, Weapons, and Ornaments of Modern Savages, illustrating the use of similar objects belonging to prehistoric times. These groups are discussed by the author under the following divisions, namely: Drift Series; Palæolithic and Neolithic Periods of the Stone Age; Lake Dwellings; Shell Mounds; Tumuli.) Under the second head I may direct attention to an essay by Mr. Wake, on "The Influence of the Phallic Idea in the Religions of Antiquity," in the July and October numbers of the *Journal of Anthropology*. It is evidently the result of an enormous amount of study, and no one can read it without feeling deeply interested in its contents. I must, however, warn sensitive or very orthodox readers that it contains some *very advanced* opinions. After noticing the wide difference of Phallic worship among primitive people and man's modern races, he points out that "circumcision, in its inception, is a

purely Phallic rite, having for its aim the making of that which from its association is viewed with peculiar veneration, and it connects the two phases of this superstition, which have for their object respectively the *instrument* of generation and the *agent*." He adopts the view of the late Dr. Donaldson (see his "Jashar"), in regarding the Mosaic account of the "fall" as a Phallic legend—the "eating of the forbidden fruit" being simply a figurative mode of expressing the performance of the act of generation. He further quotes various facts which he thinks justify them in regarding "the tree of knowledge" with the fig-tree, "whether the sycamore or the banyan," while the protecting *kerub* (or cherub) was the sacred bull of antiquity which symbolized the productive force in Nature, and occupied a prominent place in Eastern and Egyptian cosmogonies. The groves planted by Abraham, and subsequently to the reigns of the kings of Israel, and the pillar-worship, in which the patriarchs took part, are merely ancient Phallic symbols. Toward the close of the essay Mr. Lesley's views on *Arkism*, *Ophism*, *Methraism*, and *Phallism*, as laid down in his "Origin and Destiny of Man," are discussed at some length. Mr. Wake regards the Noachian deluge, even on the hypothesis of its being only partial, as "a simple absurdity." "If, however," he adds, "we read the narrative in a Phallic sense, and by the ark understand the sacred *argba* of Hindoo mythology, the Yoni of Parvati, which, like the moon in Zoroastrian teaching, carries in itself the germ of all things, we see the full propriety of what otherwise is incomprehensible. . . The primeval ship is not the ark of Noah or Osiris, or the vessel of the Phœnician Kabiri. It was the moon, the ship of the sun, in which his seed is supposed to be hidden until it bursts forth in new life and power." This remarkable paper ends with a notice of the Phallic character of Hindooism and Buddhism, and the Phallic symbols of Christianity. Probably no society in London, except the Anthropological, would have listened without protest to the concluding remarks. Many of your readers will probably now learn for the first time that "there can be no question that the fundamental basis of Christianity is more purely 'Phallic' than that of any religion now existing."

The meeting of the 5th of April, the day on which Mr.

Wake's remarkable essay was read, was devoted solely to this subject, opening with the reading of a paper by Mr. Westropp; and the two essays were discussed together. As Mr. Westropp's paper was at once demolished by the first speaker, who showed that it did not contain a new fact, and repeated many previously-corrected errors, it is unnecessary to refer further to it. Mr. Wake's paper excited, as might be expected, a good deal of discussion, sixteen members, including one clergyman, having something to say on the subject.

Under the third head there are several papers that claim our attention.

Mr. David Forbes, whose reputation as a mineralogist is almost as great as was that of his lamented brother Edward in natural history generally, has communicated to the Ethnological Society an exhaustive memoir on "The Aymara Indians of Bolivia and Peru," among whom he lived from 1859 to 1863, inclusive. It extends over more than one hundred pages, and treats of their early history, their present mode of government, their numbers as taken at the last census, their physical characters (including the effect of their elevated position, from 10,000 to 16,500 feet above the level of the sea, on their respiratory and circulatory organs), the corresponding characters in mixed races and adjacent people, their rate of increase, their special diseases, their mental and moral characters, their powers of physical endurance, their religious ideas, their feast-days, their superstitions, their customs at births and funerals, their dress, their food, drink, fuel, and cooking apparatus, their dwellings and furniture, their ancient architecture (before the Inca conquest in the eleventh century), their roads and bridges, their occupations, the plants they cultivate, their domesticated animals, their language, and their literature.

I must content myself with a reference to one or two of these topics, and I shall begin with the physical characteristics of this singular race. The men are massive without being large, short, thick-set, and beardless; their average height being five feet three inches, while that of the women is only four feet eight inches. They are a somewhat large-headed, small-eyed, long-bodied, short-legged, and small-footed race, whose form is more indicative of strength than of beauty. The women are

too robust and heavy in their movements to be graceful; and neither men nor women ever become corpulent. The facial angle differs but little from that of the European. The skull is somewhat long from behind forward, but the very elongated skulls that have been brought to Europe, and described as belonging to this race, are not natural productions. The supra-occipital or interparietal bone, the *os inca* of Tschudi, although more common among the American races than in any others, is not peculiar to this or any Titicaca race.

There is no hair on any part of the body but the head, in which it extends very low down on the forehead, and is very abundant and long in both sexes. It is of a deep-brown or black color, quite straight, rather fine, and never falls off, nor becomes gray or white. The men draw it backward and plait it into a long pig-tail, sometimes reaching to the knees. The women have two pig-tails, one hanging down on each side. The color of the skin of an infant is not much darker than in the white races, but it soon acquires the permanent hue of the parents, which varies, according to the elevation and climate, from a blackish-brown to a bilious-looking light-brown tint, with, in all cases, a shade of red. To his surprise, Mr. Forbes always found the faces of these Indians lighter in color than the other (covered) parts of the body.

The relatively great size of the body at once attracts attention. The major part is occupied by the chest. The neck is thick and usually short; the shoulders are very broad; and there is thus an internal capacity of the thorax affording space for very large lungs. The circumference both at the waist and navel is unusually large; but that of the pelvis is large only in the women. The arms are short, but the legs are relatively shorter; the lower extremity, from the tip of the trochanter major to the ground, being exactly one-half of the entire stature, while in both the European and negro it is much greater; and, contrary to what occurs in all other nations, the thigh is slightly shorter than the leg. The following numbers, taken from a very elaborate series of measurements, will show these peculiarities more clearly. The figures under 1, 2, 3, refer respectively to normal Aymara Indians, living in high, cold mountain-regions, to Englishmen, and to West-African negroes.

The measurements refer to the stature, which is taken at 1,000.

	(1.)	(2.)	(3.)
Length of humerus	179	188	193
“ radius.....	148	147	176
“ hand, from wrist to tip of } forefinger. }	108	107	117
“ entire arm, from shoulder- } joint to tip of forefinger }	435	442	488
“ femur	211	244	258
“ tibia.	252	230	241
“ foot at sole to tip of great-toe.	137	148	153
“ entire leg, from trochanter } major to the ground .. }	500	522	540
“ do., inside from fork to } ground..... }	444	495	502

From these measurements we see that the Aymara has the shortest, and the African the longest, arms and legs of the three races.

At the risk of being wearisome, I must give a few details regarding the enormous expanse of the chest in this race :

If the heights of the side of the chest be measured from the shoulder down to the lowest rib, the numbers are 228, 175, and 179, for Aymara, European, and negro, while those of the entire trunk from the seventh vertebra to the coccyx are 363, 347, and 323, respectively. The circumference of the chest under the armpits in the three races stood as 580, 518, and 494; while that of the waist was represented by 473, 433, and 447, respectively. These figures suffice to show the vast capacity of the Aymara chest.

Mr. Forbes leaves it for ethnologists to explain the causes that have led to the peculiarities in the length of the extremities and their constituent parts. The enormous development of the chest is doubtless connected with the fact that these Indians live at a greater elevation above the level of the sea than any other known people, and in so rarefied an atmosphere that it would require a larger development of the lungs in order to take in the amount of oxygen at each respiration equal to the volume found necessary to keep up the same activity of circulation at the level of the sea. Hence probably it is that these

Indians do not suffer from the puma, which so frequent attacks and proves fatal to white travellers in ascending the higher parts of the Andes. On descending from their normal heights, these Indians, like their llamas and alpacas, find themselves totally out of their element, and, if they do not so return, die off in large numbers.

Their power of walking long distances is very great. The post from La Paz to Tacma, a reputed distance of two hundred and fifty miles, was carried, during Mr. Forbes's residence in Bolivia, by a single Indian, on foot, in five days; an Indian walking at a half trot, accompanied his mule on one occasion sixty-nine miles in a day; and for a period of three weeks a Bolivian battalion marched, on an average, forty-five miles daily.

They live chiefly on vegetable food, including potatoes of several varieties, the *papa amarga*, or bitter potato, maize, Indian corn, beans, peas, onions, garlic, Peruvian rice, etc.

Next in importance among this class of papers must be placed Major King's memoirs, read to the Anthropological Society, on "The Aboriginal Tribes of the Nilgiri Hills," which contains much new matter regarding the habits and modes of life of the Vadacas or Badaghas (commonly called Burghers), a race that has recently (about two hundred years ago) migrated from the hills to the northern plains, and of the old hill-tribes the Todas, Khotas, Erulas, and Kurumbas; a paper communicated by Colonel Showers to the Asiatic Society of Bengal on "The Meenas of Central India;" Dr. Short's paper, read before the Anthropological Society, on "The Armenians of Southern India;" an anonymous article in the *Anthropological Journal* on "The Negritos of the Philippines," based upon Dr. Semper's German work on the Philippine Islands; and a paper, by Dr. Beddoe, on "The Kelts of Ireland."

The only new books on anthropology that deserve special remark are:

"The Origin of Civilization, and the Primitive Condition of Man," by Sir John Lubbock, Bart.¹; and "Researches in

¹ Republished by Appletons' and reviewed in this number of the *PSYCHOLOGICAL JOURNAL*.

the Early History of Mankind," and "The Development of Civilization," by E. B. Tylor (second edition).

In consequence of the length to which this letter has already extended, I shall postpone my proposed remarks on forensic medicine to my next communication.

ART. III.—*Sleep and Dreams.* By EWALD HECKER.

IN all times sleep and dreams have been treated by philosophers and naturalists with a peculiar interest, and it appears therefore so much the more strange that, until quite recently, one of the most important questions suggested by these topics has been answered in a very imperfect manner only. We refer to the inquiry in regard to the real cause of sleep, and the reason for its periodical return. Only two years ago Prof. Pettenkofer, of Munich (the same who has also gained a wide reputation by his discoveries of the causes of Asiatic cholera), succeeded, incidentally to his experiments regarding the interchange of gases within the human organism, in giving a perfectly satisfactory solution of this question.

It has been known for a long time that the oxygen we take into our system, by the process of respiration, plays a very prominent part with regard to assimilation within our organism, inasmuch as, by its combination with the constituent parts of our body, the vital forces are produced in the latter. For the least vital function performed by us, a certain quantity of oxygen is disposed of. It is, as it were, the steam-force which propels our life-machine. The quantity of oxygen absorbed can be measured by the quantity of carbonic acid produced by its influence and eliminated by respiration. Such measurements now have been made by Pettenkofer in company with Voigt, by means of an apparatus especially constructed for this purpose, and they have led to the unexpected discovery "*that, during the day-time, even with a small expense of force in labor, we excrete comparatively much more carbonic acid, or in other words absorb a great deal more oxygen, than we take in during the same time.*"

This remarkable fact led of course immediately to the im-

portant question: "By what means do we make up for this deficit of oxygen which is produced in the course of every day?" This question, too, is completely answered by Pettenkofer's experiments. Sleep is the provident secretary of finance, who, night after night, by wise economy, equalizes again the oxygen-deficit of every day. For, during our sleep, we do not only use but half as much oxygen as during the daytime, but we also take in nearly twice as much of it as during our wakefulness.

Thus, during our sleep, oxygen is stored up in our organism to such an amount as to enable us without alarm to look forward for the deficit of the following day. Is this arrangement not truly admirable? How many a government would be happy to have the services of a secretary of finance who understood thus to forestall the threatening deficit of the next fiscal year! So we see it here again: Nature is in all things the best teacher—let us then listen for once to a lecture on national economy given to us by sleep!

We made already the incidental statement that every vital function of our organism, however unimportant, requires the expense of a certain quantity of oxygen. Every motion, every sensation, nay, even every thought, is such a function. When, therefore, we shake hands with a friend, when we tenderly look upon any one, when we vividly think of any one—nay, and especially when our heart begins more quickly to pulsate at such an occasion, we always suffer a certain loss of oxygen, which consumes a certain quantity of the substance of our body, and transforms it into carbonic acid. This view of the matter seems to be dreadfully materialistic; yet it is perfectly correct; at least it is proved to be so by the economy of our body. The latter has during its sleep the task of saving oxygen, and this task it performs, like an honest housekeeper, by avoiding all unnecessary expenses for luxuries, and by confining its outlay only to what is absolutely necessary for its support.

But what are such luxuries of our organism? In the first place, we must consider such to be all the activities of our senses, since they are not absolutely indispensable for supporting life. During sleep, therefore, all the appropriations for

the sense of vision may be saved without hesitation. At first, the muscles of the eye refuse their services. A peculiar sensation of pressure and heaviness in the upper eyelid, announces to us the commencing relaxation of the lever which raises the lid, and the impossibility of fixing any object with our eye, betrays to us that the muscles which cause the convergency of the axes of the eye are no longer able to perform their duty. Our glance, therefore, stares into the vague. With the closing of the eyelids ceases at last every irritation of the retina, and even the visual nerve becomes inactive.

The organs which next discontinue their activity during sleep are the ears. They cannot be closed like the eyes; they therefore cannot so easily fall asleep as those. Here sleep must, as it were, first struggle for its right. The best studies regarding this matter we can make, when we have the misfortune (or shall I say the good fortune?) of falling asleep during a tedious lecture or sermon. After gradually having lost the thread of connection, and when our eyes already enjoy their well-earned rest, we still hear the words sounding on our ear. But we are no longer able to correctly comprehend them. They become more and more confused, and are finally lost in a dull, inarticulate murmuring, which apparently grows more and more distant, and at last entirely disappears for us.

In the mean time, our sense of feeling likewise begins to deny its service. In vain does our kind neighbor endeavor by gentle touches, by stepping upon our foot, etc., to prevent us from the scandalous scene of falling asleep. It is of no use, our feeling is, although not altogether gone, yet reduced to such a degree that it reacts only in reply to more vigorous irritations. The senses of smelling and taste also cease to be active—and thus we are at last nearly without the use of all our senses.

At last the voluntary muscles also are relaxing. When we fall asleep while lying in the comfortable bed, we are not fully conscious of this occurrence. The best studies in this respect we can likewise pursue while listening to a tedious address, during which we feel compelled to fall asleep. Who has not under such circumstances felt vexed by his impertinent cervical muscles which suddenly deny their services, and are

absolutely unwilling any longer to carry the head? As long as the struggle between sleep and wakefulness is carried on, it is accompanied by that nodding of the head which is so amusing and suggestive to the malicious spectator. Hence the dozing, so called.

Thus, our body has done its duty as an economical *pater-familias*, and completely discarded all appropriations for expenses of pleasure and luxury. But, not satisfied yet, he still considerably reduces the budget for the nourishment of the cellular tissue and assimilation. The heart diminishes its motion at the rate of from three to ten pulsations per minute, the blood therefore comes into less frequent contact with the tissues, and consequently also gives off less oxygen to them. This of course considerably limits in part the functions of all organs of the body; above all, does one very important organ, the brain, suffer in consequence, and this requires a more detailed explanation.

The brain is that organ which is to be considered as the seat of our mental functions. No matter whether we embrace the materialistic or spiritualistic view, we yet must adhere to the fact that all activity of the soul and mind is unalienably connected with the brain. The brain is, as it were, the instrument by means of which our soul manifests its activity. And, as even the most proficient player can upon an imperfect musical instrument produce only imperfect music, so also is our mental capacity directly dependent upon the quality of the brain. If, as is the case during sleep, the nourishment of the brain is essentially reduced by a less frequent supply of blood, and if, as has been proved by Durham's investigations with sleeping animals, whose craniums had previously been opened in part, the arteries which furnish the medium for the supply of oxygen are contracted, and less full than in the wakeful state, then the capacity of the brain can also be only a limited one. The mental activity is reduced to a minimum, and especially all the more complicated processes within it—as, above all, the activity of the intellect must come to a complete stand-still. It is true that even during sleep our thoughts and ideas are formed according to the same indestructible laws as during our waking, yet they lack the regulating and restrain-

ing guidance of criticism and judgment. This limited activity of the brain we call "*dreaming*."

The dream is therefore not, perhaps, a confused, obscure, unintelligible "something whose origin we do not know," but is a product of the same function of the brain which is also active during our waking.

Our thinking during the dream follows, as well as the thinking during our wakeful state, the laws of the *association of ideas*, so called, by virtue of which every conception at the very time of its origin calls forth a series of other conceptions and images, kindred to it by similarity of objects, similar sound of the words denoting them, simultaneous occurrence, or other circumstances of this kind. And thus we are led, for instance, when left to the association of ideas in the wakeful state, without arbitrarily influencing the former, from the report of a gun which we hear, to the idea of a chase, and this again recalls to our mind the newspaper reports that the King of Prussia has gone to Sans-Souci, to attend a chase. The similar sound of the words may thus induce us to think of a man by the name of King, etc.

While now in our wakeful state our criticism always restrains the free play of our imagination, and prevents us from associating too uncommon things, during our dreams the association of ideas reigns without any restraint whatever. While the conceptions of a waking person follow each other in succession, they are in a dream often simultaneously produced, and combine with each other to form a whole. Or else the rapidity and indistinctiveness of the association of ideas cause one conception unconsciously to take the place of another, and thus produce the strangest dream-combinations, in tracing whose real origin we but seldom succeed.

When awake we can, as I stated before, call forth conceptions at our free will. We can think of what we wish. Yet this is not always done. Very often, without any action of our own—as the saying is, by accident—some object occurs to us out of the treasure of our recollections, which we either arbitrarily follow up in thought, or which, by the association of ideas, leads us involuntarily to some other thought. Even in our dreams, where an arbitrary production of definite con-

ceptions is impossible, thoughts are involuntarily suggested to us by recollections. Generally, it is some striking and marked impression which we have received during the day, or some thought that occupied us shortly before our falling asleep, which gives the first impulse to a series of dream-pictures. Often such conceptions are spun out to some length in our dreams; but often the association of ideas leads us quickly to others, and we are thus no longer able afterward to show up the connection between the ideas of the day and of the dream.

Most frequently, however, we receive in our wakeful hours the first impulse to some series of ideas by the impressions of our senses. During our sleep, now, it is true, our senses, as we saw, have ceased their functions, yet they are, nevertheless, to a certain degree capable of being excited. Especially the senses of feeling and hearing are, even in a state of profound sleep, still capable of reacting upon more vigorous impressions. But the image produced by such an impression is almost always only an indistinct and confused one, which, on this very account, is often transformed into other conceptions, just as we may easily in the twilight take the trunk of a tree for a man sitting by the wayside. The indistinctiveness of the impression leaves it to the play of the imagination to fill it out or to individualize it, and thus it happens that an excitement of the sense of feeling or hearing, caused in sleep, becomes the cause of a dream-picture which employs the original impression only in its most general outlines as the foundation of the dream-structure. There are many examples of this kind related in literature. Meyer (in his "Attempt to explain Somnambulism") relates how he once dreamed that he was surprised by robbers, who threw him on his back to the ground, and drove a post into the ground between his great and second toes. On his awakening, he found a straw between these two toes!

Another one relates how once on his retiring he laid a hot warming-pan against his feet, and then dreamed that he was travelling on the summit of Mount Etna, and there wandering about on molten lava. In a similar manner we often dream, after having thrown off the bed-covering in a fit of restlessness, that we are in midwinter going through the streets half clothed. Thus a gust of wind blowing out of

doors suggests a dream of a great tempest and the wreck of a ship. Or, a rap at our door gives rise to a dream of a band of robbers, etc. Very seldom it occurs that actually-spoken words are distinctly heard in sleep, and, as words, incite in the dreaming person the corresponding conceptions. Some instances are related how in such a manner the dreams of a sleeping person could be directed, as it were. Dr. Abercrombie, for instance, relates: "The comrades of an English officer engaged in the expedition to Louisburg, in 1758, amused themselves by whispering words into his ear, by which they could excite him to all kinds of dreams." Kluge relates another instance: "A rejected lover, who, however, enjoyed the favor of his lady-love's mother, obtained the permission of the latter, in accordance with the advice of a clever woman, to whisper his name into the ear of his beloved one. Soon, a remarkable change could be noticed in the girl, who became well-disposed toward him, and finally accepted him. Asked in regard to this change in her disposition, she replied that she had learned to love her husband in vivid, frequently-recurring dreams." Although I cannot vouch for the truth of this narrative, I should yet not feel inclined to entirely deny the possibility of the facts it relates.

More frequently almost than by the perception of our outward senses, dreams are produced by the excitement of the inner sense of feeling. By this inner sense of feeling I understand that action of the feeling which informs us regarding the condition of all the organs of our body, and which especially comprises the ideas of health and indisposition. In a state of perfect health we have no sensation of the functions of our single organs. We do not feel that we have a stomach, a heart, muscles, etc. As soon, however, as the functions of these organs suffer any disturbance, we are—apart from the sensation of pain which such disturbances often cause simultaneously with their occurrence—informed of them by a certain indefinite sensation of discomfort.

Even in sleep we have these sensations, but they are, of course, only obscure and indistinct, and they are in a similar manner as the impressions of our outward senses, accompanied by definite symbolizing dream-conceptions. Most generally

known is the phenomenon of nightmare, so called, which comes under this head. It has its origin in a diseased condition of the muscles of respiration, and in an oppression of our breathing resulting therefrom. An overfilled stomach, which crowds the diaphragm, and thus oppresses the lungs, can produce similar phenomena. While we trace in our wakeful hours such disorders of our respiration immediately to their true cause, namely, to a local affection of the organs of the chest, we are in our dreams not capable of such reflection, but, in full accordance with the laws of the association of ideas, the feeling of oppression calls forth the idea of pressure and the image of a pressing object. We accordingly dream, for instance, that a heavily-laden wagon is going over us, or that a dark spectral form, some ugly demon, is detaching itself from the ceiling of the room, and slowly descending upon our chest. Frequently, also, a great anguish or a sudden fright is feigned by the dream instead, because such consternations are likewise apt to take our breath. Then we dream, for instance, that we are attacked by robbers, from whom we try to escape by running, but our feet refuse their service—we remain, as it were, rooted to the ground. Tormented by greatest anguish, we wish to call for help, but to our horror we are unable to produce any sound whatever—until at last after long, vain efforts, the spell which held the respiratory muscles is removed, and we often awake with a cry.

In a similar manner may be explained the dream of falling from a great height, which is no doubt familiar to all. It occurs principally while we are falling asleep, and has its cause in the fact that the muscles which then gradually relax are suddenly contracted again by a momentary irritation, and, in consequence cause a sudden shock of our body, such as we experience by falling from a great height. Somewhat different is the likewise frequent dream of flying. According to Scherner, it is caused by our becoming conscious of the sensation of the activity of our lungs. He thinks that the upward and downward motion of the lobes of the lungs produces this sensation. Thus there are quite a number of other conditions of our body, which, when we become partially conscious of them, awaken quite definite dream-conceptions within us according

to the laws of association of ideas. To mental affections a determining influence upon the character of our dreams is attributed. "Great joy produces other dreams than heavy grief, passionate love other than hatred, deep repentance, and scruples."

If we accustom ourselves to attentively observing our dreams, we may easily find the confirmation of the laws just stated. But we shall then also observe that it is very difficult to recall a dream correctly and accurately. This fact may be traced to a double cause. In the first place, the dream-pictures are, in by far the greatest number of cases, so indistinct and pale, and so indefinite in their details, that, in our efforts to recall them, we involuntarily use the colors of our wakeful power of conception to give to these pictures more definite hues and outlines. The second cause may be found in the natural tendency of the human mind to see all things in a logical connection. Since, then, our dreams consist of a series of pictures, which are often but very loosely connected by the association of ideas, we are very apt, when reproducing them during our wakeful hours, to quite involuntarily give them a logical connection corresponding to that of real life, which they originally did not possess.

During the soundest sleep, the function of the brain is so weak that we retain no recollection of it at all, and therefore call such sound sleep dreamless. Sometimes we know indeed *that* we have dreamed, but in spite of all our efforts we are absolutely unable to recall even the slightest trace of *what* we have dreamed; only shortly before our awakening, when the oxygen stored up in the blood again begins to give a more vigorous impulse to the activity of the brain, dreams become more vivid and connected, and consequently are more easily retained in our memory. Very rare are those cases in which the vividity of the dream is so great as to disable us from distinguishing it after our awakening from our actual experience. Prof. Jessen, in Homheim, near Kiel, celebrated for his successful treatment of mental diseases, relates the following instance in illustration of this:

"On a wintry morning, between five and six o'clock, I was aroused, as I thought, by the head nurse, who reported to me

that some people had come for one of the male patients, and who, at the same time, asked me whether I had any particular orders to give. I replied that the patient might depart, and after he had left the room I turned around to go to sleep again. All at once it struck me that I had previously not heard any thing regarding the intended departure of this patient, but that only the prospective departure of a woman of the same name had been reported to me. This compelled me to inquire more particularly after the circumstances, and accordingly I lighted a candle, rose, dressed myself, and went to the room of the head nurse. To my surprise I found him only half dressed, and in reply to my inquiry after the people who had called for the patient, he said, with an expression of astonishment, that he did not know any thing of it, as he had but just left his bed, and no one had called on him. This answer did not arouse my consciousness, but I rejoined that then the steward must have been in my room, and that I should accordingly go to see and ask him regarding the matter. When descending a few steps in the middle of the corridor which led to the room of the steward, I suddenly became conscious of having dreamed only what until that moment I had believed to be an experience whose reality I had not doubted in the least."

This case is particularly remarkable from the fact that, some time after his awakening, after the dreamer had been fully aroused by his dressing himself and going to the room of the head nurse, the illusion which took the dream for reality still continued, and thus suddenly vanished without any particular cause.

More frequent, comparatively, are those cases in which the awakening is not complete, but still sufficient in order to exert a corresponding reaction upon the dream which is taken as reality. There are narratives of instances where people in a half-wakeful condition, deceived by a horrible dream, have done acts of violence for which they were of course not responsible.

A very interesting instance of this kind is reported by Büchner, in Henke's *Journal of Medical Jurisprudence* :

"Christian Jünger, of the garde-du-corps, twenty-two years old, enlisted three years since, of the most exemplary

conduct, and a quiet character, slept on a bed of boards in the guard-house, at 12 m., when the corporal tried to wake him to have him sweep the room. Jünger arose, seized the corporal by his breast, without saying a word, drew his sword and attacked him; but the latter succeeded in parrying the stroke. As Jünger continued to brandish his sword, he was disarmed and arrested by the soldiers who were present. He quietly took his seat on the bed of boards without uttering a sound. He had, the day previous and on the morning of the deed, stood guard in very cold weather, played cards during the night, drunk but little, and fallen asleep in the morning from fatigue in the hot room. The investigation disclosed the fact that he had dreamed he was standing guard, was being attacked by a fellow who seized his hair and took his gun from him, and accordingly had attacked him with his sword. Of what had actually occurred he knew nothing. He could not comprehend how he, who was so strict in his subordination, could have been guilty of such a misdemeanor against his superior. The medical certificate testified to a state of sleep, and upon this he was acquitted."

In explanation of such cases perhaps the following might be adduced: In consequence of some fatigue, such as that which in the before-mentioned instance was caused by standing guard, and the subsequent exhaustion, the deficit of oxygen in the organism has reached an abnormal degree, and the quantity taken in during a short sleep is not sufficient to induce a full activity of the brain. The surplus of oxygen is used for the less exacting, in some respect lower activity of the volitive impulse, so that the free reflection and the voluntary thinking cannot be awakened yet. This indeed we see often confirmed when trying to awake any one from a very sound sleep. Before we see him come to his full consciousness he throws himself about in his bed, stretches his arms and limbs, etc., until at last free reflection gains again the mastery over the brain, and his full consciousness returns.

But the reverse of this phenomenon we sometimes experience, inasmuch as we are occasionally able during our sleep to recognize the dream as such—a fact which Aristotle already observed. An interesting self-observation of this kind is re-

reported by Beattie, as follows: "I once dreamed that I was walking about on the parapet of a very high bridge. What had brought me there I could not understand, but, since I reflected that I never had been inclined to such actions, I began to think that perhaps I was only in a dream. Being anxious to be relieved of this alarming and tormenting conception, I plunged down, expecting to regain by this fall my senses, which I really did." Here the dream preceded the awakening immediately; manifestly, therefore, the development of oxygen had attained already such a degree as to make a limited activity of the organs of the free intellect possible, while yet the associations of the dream-conceptions in part continued.

The same takes place when we, shortly before our full awakening, try to arbitrarily spin out a pleasant dream—an experience, no doubt, familiar to all readers. Here, too, the organ of our intellect is already fully competent to resume its function, but we are still able to restrain it for a short time, and to give further scope to the fantastic association of ideas which had its beginning in the actual dream. But when once the free intellect has arbitrarily interfered with the play of imagination, then the dream is over, and we are irrevocably awake.

Awakening takes place, firstly, when the storing-up of oxygen has reached its greatest height. But, even before this time, as is well known, awakening may be caused by external influences. Strong irritations of the nerves, either of the sense of hearing, or of feeling, or even of vision, cause, by the propagation of the excitement, an irritation of the brain, which produces a stronger flow of blood, and in consequence an increased activity, resulting after a while in a full awakening. Sleep requires, as already intimated, only a partial filling up of the arteries. Every thing which produces a more vigorous flow of blood to the brain disturbs sleep, and also prevents us from falling asleep. Therefore, all passions and emotions, much thinking, bodily and mental excitement, and, in general, all means of sending the blood to the head (and overheating the head), drive away sleep; while, on the other hand, every thing which draws the blood from the brain, or contracts its arteries, produces sleep. Thus, cold applications to the fore-

head have in this respect a favorable effect, for the cold causes a contraction of the blood-vessels.

In the same manner we may explain the effect of soporific remedies, so called, especially of opium and its alkaloids (among which morphine and narcine occupy the first rank). Experiments have shown it as very probable that the opium exerts a contracting influence upon the blood-vessels of the brain, and consequently drives the blood from the brain. All such remedies, however, can have the effect only of lessening the consumption of oxygen in the brain, but not also of increasing at the same time the taking in and storing up of oxygen in the blood-vessels. But, just in those conditions in which we are compelled to take recourse to those soporifics, the capacity of the blood-vessels for the absorption of oxygen is, according to Pettenkofer's experiments for certain diseases, diminished; and this is the reason why a sleep produced by opiates, under the before-mentioned conditions, is never so refreshing and invigorating as a natural sleep. In an ordinary healthy condition, however, it is sufficient, for bringing on sleep, to keep away the specified injurious influences, and here habit plays a prominent part. In general, we do not wait for the extreme exhaustion of oxygen in the organism, but fall asleep already when the latter has attained a certain degree fixed by habit. Therefore, we are also capable of being awakened every moment. There is always a reserve fund of oxygen on hand, which makes awakening possible. In those cases where, by over-wakefulness, the deficit of oxygen has reached its maximum, sleep becomes so deep that only after some time we can be awakened.

The prevention of the injurious influences which interfere with sleep is not always in our power, since, above all, we can only seldom fully master our excitements and emotions. This requires either a very phlegmatic temperament, or an uncommonly strong will and enormous self-control. Thus it is especially related of Napoleon I. that he could sleep at whatever time he wanted, even during the battle of Leipsic. He, therefore, had the power not only of always suppressing his feelings, but also of suspending his thoughts, at will. That this is not very easy, every one, no doubt, has experienced. When

we are vividly occupied with a thought or a plan, we cannot go to sleep; we must then try to lead our thoughts into another direction, by thinking of things which do in no way excite our interest, and which, therefore, require no intensive thought, and consequently no vivid activity of the brain. In short, we must try to bring on weariness, which can be done by the most varied artificial means. But, since it is not my intention to increase their number by this treatise, I will close here, in the hope to have awakened in the kind reader some interest for, and a better insight into, the phenomena of sleep and of dream-life.

ART. IV.—*A Case of Hydrophobia.* By S. G. COOK, M. D.

HYDROPHOBIA is, fortunately, a disease of very rare occurrence; so rare that several old physicians with whom I have conversed have never met with a case, and it is rarely seen more than two or three times by our most extensive practitioners. Having recently encountered my first case, I have thought it might not be uninteresting to the profession to publish my impressions of it, with an account of the symptoms as I saw them. Some of the following facts were collected from the parents and neighbors of the child—the rest from personal observation:

On or about the 20th of August, 1870, Louis Edward Behey, aged about three years, was bitten on the right forearm, an inch or two below the elbow. The animal by which he was bitten was a bitch, “in heat” (*ardor venereus*), which previously had shown no symptoms of *rabies*. Unfortunately, she was at once killed; therefore, we do not know whether any further symptoms would have been developed in her or not. The circumstances of the bite were as follows: the bitch, which, according to the description, must have been a water-spaniel, having been confined (alone) somewhere in the back part of the house, was being led through a hall to the street. The boy, being in the hall, tripped over the rope, and fell against the bitch, which, being frightened, gave him a snap as before described. The wound, which was quite superficial,

healed readily under the domestic treatment of the child's mother, and nothing more was thought of it until quite recently, the child being, to all appearance, in perfect health.

During the evening of Tuesday, Nov. 15th, nearly three months having elapsed since being bitten, his parents noticed that he was sleeping very badly, and, after midnight, did not sleep at all.

Wednesday, Nov. 16th.—Was noticed to be very animated in his conversation, averse to going out-of-doors, or to join in the sports of the other children; impertinent in his replies to questions; abstained from food and drink; would get angry if any restraint was placed upon him, and, as his mother expressed it, "was cranky all day." The same condition of things continued through the night and all the next day.

Thursday, Nov. 17th.—About 11 P. M. his mother called on me, requesting me to go and see him, answering my question as to what was the matter, that he was acting very strangely.

On entering the room and seeing several children, and not noticing any thing wrong with any of them, I very naturally inquired which was the patient. I was pointed to a little boy, sitting at a table, in a high chair. On approaching him, he turned his face toward me, revealing the most peculiar-looking eyes I have ever seen. They were not like those seen in persons suffering from delirium in prolonged fevers, nor yet like those we see in the second stage of cerebral meningitis, although somewhat resembling both of these conditions, but more like the eyes of a person in a fit of violent anger, slightly combined with a feeling of fear.

When I reached out my hand to touch his, he shrank from me as from a blow, at the same time making a desperate effort to catch his breath, precisely as a naked person might if a pail of cold water was unexpectedly poured over him. This I understood to be a laryngeal spasm. It was very brief, lasting but the fraction of a minute, probably not more than ten seconds. I took a seat at a little distance from him, where I could see his every motion, and regarded him attentively for a long time.

He seemed an unusually intelligent child for one of his

age, speaking very distinctly, with a clear, ringing voice, which his parents informed me was a little unnatural, inasmuch as it "seemed strained." He had, at times, a disposition to stammer, which was also unnatural. For one hour after my observation commenced, he talked almost incessantly of dogs, and repeated but very few sentences a second time. He seemed familiar with all the most common breeds, relating some anecdote of the bull-dog, the mastiff, the bird-dog, the spaniel, the coach-dog, and the poodle.

Connected with all his narratives, was a tragic or gloomy termination. The mastiff, after carrying him an incredible distance about the city, finally disappeared through a bottomless hole in the street, he only escaping from a similar fate by suddenly dismounting. The bull-dog, after bringing for his admiration and pleasure a great variety of puppies, suddenly turned cannibal, and swallowed the whole lot. The spaniel, after having been his playmate for a very long time, finally took it into his head, one day, to get on a coffin that was being carried through the streets on the top of a very high wagon, and ride away, to reappear no more.

Where a child of his years could have learned, or heard, or imagined, so much of dogs, I am at a loss to know.

At frequent intervals his talk was interrupted by the peculiar and prolonged inspiration before mentioned, and once, as a woman came in and attempted to caress him as she seemed in the habit of doing, he flew into a terrible paroxysm of rage.

Next to the appearance of his eyes and conversation, the most noticeable thing I observed of him that night was the action of his fingers, which were continually in motion, without seeming to have any object—not the clinchings of delirium, nor yet the pickings of fever, but a simple incessant unrest.

Twice, during the hours I watched him, I saw him clutch the place on his right arm where he had been bitten, as though a twinge of pain was there, but, when questioned if there was any, he said not.

After many failures, he allowed me to put my hand on his. I found the skin natural to the touch, pulse 144. The skin

was exceedingly sensitive; a current of air or the touch of a feather throwing him into a spasm. Although fully convinced that the disease before me was *rabies canina*, I now resolved to apply an important test, and requested them to bring him something to drink. At sight of it there commenced a series of laryngeal spasms, with clutchings at his throat, far more violent than any I had heretofore seen. The pupils of his eyes, which had been all the time largely dilated, were now increased to their full size. During the five minutes I held the cup of liquid a short distance from him, say two feet, the spasms and clutchings continued at the rate of four or five per minute, the intervals being filled with a series of short pants, he never once removing his eyes from the cup. I now took some of the liquid (which I believe was milk and water) in a spoon, and, approaching it to his lips, asked him to drink it. His face was now seized with violent contortions, he struck out wildly with his hands, kicked convulsively with his feet, and for the minute I held it close to his lips did not appear to breathe at all, and would to all appearances have died, had I not taken it away. This experiment, or test, made my diagnosis of hydrophobia doubly sure.

Then the question arose as to what should be done for him. All treatment, as far as I had learned, had been a failure—except that, in some newspaper or medical journal (which of course I have since been unable to find), there was a detailed report of a case cured by a hot-air bath at a temperature exceeding 160° F. Informing the parents of what I proposed doing in the morning (it being now long past midnight), and enjoining them to keep him quiet, I left him.

Nov. 18th.—Visited the proprietor of the Turkish Baths in Laight Street, and informed him of the object of my visit. He very kindly, at much personal and pecuniary inconvenience, placed his bath at my disposal. Returned to the patient at 9 A. M., and was much disappointed and chagrined to find the mother peremptorily refusing to allow the child to be taken from the house. No process of reasoning or entreaty could move her, and I had to give it up.

My friend Dr. D. C. Logue, who visited the child with me this morning, suggested that we give it hydrate of chloral—

but how? It was still impossible to get any liquid to his lips. Could we administer it by the rectum without increasing the malady?

At this stage we consulted Prof. W. A. Hammond, M. D. who advised us to try the chloral by all means, and to administer it hypodermically, though he had little hope of a beneficial result.

12.30 P. M.—Have watched him attentively for one hour. Pulse weaker, but very distinct. Speaks mostly in whispers. No sleep. No drink. Fingers still in motion—otherwise sits very quietly on his mother's lap. Spoke to him of an orange. Seemed very much delighted at the thought of having one but when procured could not get it to his lips. Seemed very anxious to suck the juice of it, but something prevented. Even the touch of the moist orange to his fingers, and the palm of his hand, caused a series of convulsions, but his great desire caused him to retain his grasp and make repeated efforts to get it to his lips, even sticking out his tongue to meet it, but that same invisible power prevented. It did not touch his lips. Having read, or heard, that patients with hydrophobia could eat ice, I ordered it tried with him, but without success. Although he seemed very anxious to get a piece of it in his mouth, every touch of it threw him into such violent spasm, that he soon gave it up and desired us to take it away. More than sixty hours have now elapsed since he has tasted food, or drink, or has slept, and still the little fingers keep moving. The eyes begin to assume a sunken appearance, and the pulse is growing less distinct.

1.30 P. M.—The patient was now visited by Prof. Hammond, who, after a careful examination, and after being entirely satisfied as to the correctness of the diagnosis, injected about three and a half grains of hydrate of chloral (the solution being of a strength of $\mathfrak{D}\text{ij}$ to the oz.) under the skin of the left thigh, about two inches above the knee.

4 P. M.—Symptoms more quiet. An hour ago consented to be placed on the bed, where he has since remained, tolerably comfortable. Has a spasm every six or eight minutes, but very slight. Fingers still uneasy. Talks only in whispers. Love of money still strong, as evinced by the tenacity with which

he clings to a small coin I gave him. Is going to save it for shoes to wear at his Christmas-party.

Are the subdued symptoms the effect of chloral, or the exhausted condition consequent upon long fasting?

4.30 P. M.—I gave seven grains of chloral, administered as before.

5.30 P. M.—The hands are beginning to get quiet. Speaks loud and distinct when he does speak, but is not so talkative. Answers all questions rationally.

5.35 P. M.—Hands still. Shows a disposition to sleep, but does *not* sleep.

5.45 P. M.—Asked for some tea, but when presented grew very violent.

6.15 P. M.—Has been entirely quiet during the past ten minutes, the eyes being closed about half the time.

The condition had now arrived for which I had been anxiously awaiting. I had hoped that, just between waking and sleeping, his repugnance or fear of swallowing would be so far overcome, that we would be enabled to get him to take some nourishment. The experiment again proved a complete failure. No sooner did it touch his lips, than he started from his half-sleeping condition and became extremely violent, striking out with his hands, and imploring us to take it away. All traces of sleep now disappeared. The laryngeal spasms returned, occurring every three or four minutes, and the fingers resumed their nervous *subsultus* action. The voice is still clear and distinct. Asked to see his baby-brother, and, when brought, caressed him very affectionately. Talks of what he will do when he gets well. Pulse getting very indistinct. Extremities cold. Dissolution fast approaching.

He died as the tower-bell struck nine at night. About 8 P. M., or one hour before his death, there commenced to flow, without any retching, straining, or any of the usual symptoms of vomiting, a constant, steady stream of frothy mucus or saliva from his mouth, and occasionally from his nose, which continued until within about five minutes before he died, accompanied by general convulsions. As it stopped, his father asked him if he should take him up and hold him on his lap. "No," he replied, "let me lie down," showing that he re-

tained his consciousness and was rational to the last. Five minutes later, and he died as quietly as though going to sleep.

There are some points about the case which it may be well to recapitulate :

1. The inoculation of virus having been made by a bitch, it being a popular as well as professional fallacy that *rabies* is never produced by the bite of a female animal.

2. The bitch being in heat. Does that condition make the bite more dangerous? Or is a bite at such times always liable to be followed by unpleasant consequences? Is there any corroborative evidence? (I learn that one Thomas O'Hara was bitten by a bitch in a similar condition, in the Eighth Ward of this city, and several weeks after was attacked by what was popularly known as hydrophobia, and was taken to Bellevue Hospital, where he soon after died. But, from the evidence I have thus far been able to obtain, it is difficult to determine whether he died from delirium from drink, from hydrophobia. This occurred in 1863.)¹

¹ The following note, received from Dr. Cook, as this sheet is passing through the press, gives additional interest to the very important case here reported :

NEW YORK, November 26, 1870.

DEAR SIR: A carefully-extended search of the records of Bellevue Hospital confirms the popular impression of this locality respecting Thomas O'Hara. I find that he was admitted to the hospital May 11, 1862, that he died the next day, May 12th, and that his disease was hydrophobia as attested both by the hospital records and by coroner's inquest. Other facts are as follows: The bitch was *in heat*, and was not suspected of *rabies* until several days after O'Hara had been bitten, when it began to be whispered around that she was mad, and several gentlemen expressed their determination to take their horses away from the stable if she was not killed, which was accordingly done, from seven to ten days after O'Hara's bite, she then showing no more symptoms of *rabies* than she had previously.

O'Hara's symptoms began to be manifest Friday night, September 1862, and he died Monday the 12th, three or four days after.

The period of incubation, as near as my informants can recollect, is about two months. In these dates, as in all other things, they agree entirely. The stable at which O'Hara worked was situated at Nos. 137 to 139 Mercer Street, since torn down, and the then proprietor, Horace Jones, is dead; but I have been able to find three of the employés, from whom

3. The *total* abstinence, in this case, from food and liquids, most of recorded cases being able to take both food and drink in limited quantities.

4. The absence of all disposition to harm either himself or others; it being a very popular belief (in which I must confess I had a share) that the patient has a morbid desire to bite persons or things. In this case there was no such effort made.

5. The *origin* of that immense quantity of frothy mucus or saliva, or both, which poured from his mouth and nostrils, with scarcely an interruption, for one hour. Where did or could it have come from—remembering that the child had swallowed nothing during the preceding sixty-eight hours? I am at an utter loss to account for it.

Lastly.—Did the use of the chloral have any beneficial effect? I believe it did quiet the patient somewhat, and very likely prevented the extremely violent convulsions we sometimes read of. I know it was given *too late* to thoroughly test its efficacy as to a cure. But, should another case occur to me, I should not place much reliance upon it. What would I do? I would, if permitted, test the hot-air bath. What therapeutic effect I should expect it to have I cannot tell. My next reliance would be on a thorough and speedy mercurialization, on the similar principle as that for which it is used to combat the virus of syphilis.

ART. V.—*Buried Alive.* By T. EDWARDS CLARK, M. D., of New York.

THE domain of the so-called vital forces is becoming, with the progress of science, smaller and smaller. Respiration and digestion have been successfully laid claim to by the physicist, and shown to be essentially chemical in their nature. Growth and reproduction are often found associated with electrical have obtained the foregoing facts, which you will please take the liberty of using as shall seem best.

Very respectfully,
S. G. COOK.

DR. WILLIAM A. HAMMOND.

phenomena. In the *gymnotus*, the vital forces, exerting the influence through certain organs, continue the species, but working through its organized galvanic battery, they serve as a means of defence. Light, heat, and electricity, are known to act favorably on these forces—to increase their power; and it is as probable that the former are convertible into the latter as it is that the physical forces are convertible into one another.

Hence the physicist finds little difficulty in accounting even for the phenomena of growth and reproduction; and it seems evident that he will be able to show that the vegetable kingdom is controlled entirely by one class of forces.

Animals, however, possess certain peculiarities which cannot be attributed to physical forces; for these have neither sensation, perception, nor volition. Forces, in kind like the chemical, may build up structures either in the organic or inorganic world: they may act on one another, and on matter and produce changes innumerable, but they can neither feel nor will. Every thing that the vitalists have claimed the physicists are likely to take full possession of; but these mental phenomena, manifested by all animated beings to a greater or less extent, cannot be connected with any known forces.

Under certain influences, man and the lower animals have the power of continuing to live when sensation and volition are laid entirely aside, and even when the vital functions are totally inactive, and the forces ruling in the body are as passive as those in the crystal. We have records of well-attested instances of persons recovering from drowning, after having been under the water for one-quarter, one-half, and even three-quarters of an hour, and when every indication of the presence of life was wanting. Snails have been revived after remaining for fifteen years in a dry and torpid state; and, according to Spallanzani, animalcula deprived of moisture for twenty-four years have been brought to life by a drop of water.

Organized beings are frequently observed to exist for great or less lengths of time, subject apparently only to physical or molecular forces, which are identical with those found in the inorganic world, and then to reassume those properties which we are accustomed to accept as characteristic of life. Some

may be artificially thrown into this condition of seeming death ; in others disease produces it, or it appears as a necessary provision for the preservation of the species.

In man, the vital functions may be held in partial or complete abeyance, either through disease or by an act of the will, and the words catalepsy, trance, and hypnotism, are used to signify such a temporary suspension of the powers of the body and mind. Where natural among beings lower in the scale, it is called hibernation. In cold climates, the bears, the bats, the dormice, the marmot, and the hamsters, pass the winter months in this torpid condition, but in the tropics the season of extreme heat is the time for sleep. Both cold and warm blooded animals enter into this state, which seems to be induced either by the scarcity of food or the temperature of the air, or by both combined, for it may be prevented, as in menageries, by sufficient nourishment and a proper supply of heat.

The animal economy under these conditions appears to have the power of adapting itself to circumstances, and to manifest little or no need of food ; the temperature of the body sinks, and the pulsations of the heart and the respirations become less and less frequent. The vital functions are in some almost completely checked, and in others there remain no signs of life.

In trance or catalepsy the same things occur, and the only proofs of lingering vitality may be a slight amount of bodily heat and the appearance of moisture from the breath when a mirror is held over the face. Sometimes not even these evidences of remaining life are present. Dr. Good cites the case of a female who was peculiarly fortunate in having her burial postponed for the purpose of ascertaining the cause of her supposed death by dissection, for, on being submitted to the scalpel, its first touch brought her to her senses. Quite a number of instances of premature dissection are recorded, but the number of premature interments must be very large, judging from the condition and attitudes in which many skeletons have been discovered when old graveyards have been relieved of their charge and used for other purposes. Persons have been found sitting in their graveclothes on the steps of

vaults, having, after waking from trance, died of terror or exhaustion.

Sometimes both consciousness and sensation are present and yet the patient lies corpse-like, and has no influence over the body. We read of those who, supposed either to be dead or to be impostors, have suffered every variety of torture without having the power of giving the least indication of it and of others who have been fully conscious of all the preparations for their burial, and have not been able to force their mind to act on the body till the lid of the coffin was about to be nailed down.

In that curious work, "The Dabistan, or School of Manners," translated from the Persian original, and published in Paris in 1843, we find the following: "Serud-náth, descending from Humayún, was of a noble origin. Having in his youth attained to the mastership of that sect, he could restrain his breath for two days. In 1048 of the Hegira (1638 A. D.) the author of this work saw him in Lahore." "Sanjá-náth of the sect of Ayi, was a man accomplished in restraining his breath; the people numbered him among the saints, and said that seven hundred years of his life had elapsed without his hair having yet become white; he was in the last-mentioned year (1638 A. D.) seen in Lahore."

Avicenna and Celsus speak of those who could separate themselves from their senses when they list, and lie like dead men, void of life and sense; but we would naturally give little credit to the above statements had we not well-attested instances of persons possessing the same power in very recent times. There are those who are able voluntarily to enter the trance-condition or a state more or less similar to it. Mr. Braid has discovered that, if certain sensitive individuals fix their attention on any bright object held near and above their foreheads, their eyes soon become fatigued and close. If they still continue to keep the eyes turned toward the object, they pass off in a state which, in its full development, resembles trance-coma. He has given the name *hypnotism* to this artificial method, and has resorted to it not only for the cure of nervous diseases, but even for the performance of surgical operations, the patient being insensible and entirely unconscious of all that takes place.

Dr. Cheyne has published an account, which has never been questioned, of a certain Colonel Townsend, who could die when he pleased, and come to life again. He once made the experiment in the presence of this physician, Dr. Baynard, and Mr. Skrine. All three first felt his pulse: it was distinct, though small and thready; and his heart had its usual beating. He then composed himself on his back, and lay in a still posture for some time. Gradually all signs of life disappeared. There was no pulse, no beating of the heart, and the mirror held to the mouth was not dimmed by the moisture of the breath. Those present reasoned for a long time about this strange appearance, and finally concluded that he had carried the experiment too far. As they were about leaving him for dead, they observed a slight motion of the body, and a beating of the heart; soon respiration began, and gradually life was fully restored.

Since Mohran Fani wrote his "School of Manners," other travellers have visited Lahore, and have given us such accounts of what they saw as to lead us to believe that Serud-náth and Sanjá-náth were truly-wonderful men.

Sir Claude Wade writes that in 1837 he was present at the court of Runjeet Singh when a fakir was buried alive for six weeks. Companies of soldiers guarded the spot where he was interred, and there was no chance for deception. When the lid of the box, which served for a coffin, was removed, the white linen bag, in which he had been placed, was found to be mildewed. On opening this his arms and legs were seen to be shrivelled and stiff, and his head reclined on his shoulder like that of a corpse. The medical gentleman in attendance on Sir Claude could detect no pulsation in the heart, the temples, or the arm. The servant of the fakir then began making warm applications of various kinds, and by degrees the arms and legs relaxed from the rigid state in which they were found. He now removed the wax and cotton with which the nostrils and ears had been closed, and after the lapse of half an hour the devotee was able to speak.

Sir Claude's account is lengthy and carefully drawn up, as he writes what he himself saw; but there are others who have made similar statements, fully as reliable, of natives of India,

who travel about from place to place, getting their living by being paid for spending ten, twenty, thirty, forty, or more days under-ground, sometimes buried in common graves, without even the protection of a coffin.

In this age of great mental activity the power of science is felt almost everywhere, but it has not yet reached the real connection between mind and matter, nor is it able to comprehend the true nature of either of these. Within the past year a prize of considerable value has been offered for a means of determining in all cases whether a person supposed to be dead is really so or not. We have seen that life has been only held in abeyance when the lungs and heart were totally inactive, and when the mirror held to the mouth collected no vapor. The temperature of the body helps us little to a correct decision; for in drowning it sinks early and rapidly, and in death from convulsions, and various other sudden causes, it often continues high for hours, and even days. Free perspiration, and a flush of the countenance, have given rise to delusive hopes. The flow of blood is no criterion, for we read of one who suddenly expired while at cards. His physician opened a vein in both arms, but no blood flowed. Two sleepy watchers found the floor of the room, in the morning, deluged with blood, and life was gone.

The conditions in the seed, or spore, are not unlike those in the crystal or in the egg. There appears to be an equilibrium of forces, and until this is disturbed by heat, light, or moisture, the possible plant sleeps in embryo, and the seed may remain a seed for thousands of years.

The crystal continues a crystal only so long as disturbing influences are not brought to bear upon it. When these do interfere, we may have either new crystalline forms produced, or new combinations by the union of its elements with other substances; just as the seed, under ordinary circumstances, changes to the plant-form by the addition of material from without.

The egg has in itself no progressive power. Like the crystal, or the seed, it remains stationary till acted on by external agents. If these are favorable for development, it may rearrange its particles and add to itself new elements; if

these are unfavorable, it resolves itself into many combinations.

Such considerations lead us to believe that organic and inorganic matter are not to be distinguished from one another by the kind of forces ruling in each.

ART. VI.—*Fatal Cerebral Congestion following the Administration of Hydrate of Chloral.* A Case reported by
GEORGE G. NEEDHAM, M. D.

THE patient was a married woman, aged fifty years, and in good circumstances. Her parents lived to a good age; her father was healthy; mother melancholic, late in life, but died sane. The lady had always exhibited a mental difficulty in forming decisions, and a morbid solicitude in regard to religious matters. She commenced about the close of 1868, after an occurrence which caused her great moral disquietude, and which happened to be concomitant with a slight personal injury, restraining her from out-door exercise, to exhibit distressing "nervousness," to complain that her death was near at hand, and that her friends did not sympathize with her. Later, she was freed from her excessive fear of impending dissolution, though she still complained of vague pains in her limbs, and a singular feeling in her head. She showed a great desire to join in all plans of the family which promised enjoyment, but generally succeeded in spoiling them for herself, and often for the others, by her hesitation and suspicions. She called a number of physicians in succession, whose services, however, were retained but a short time respectively. So many of them ordered the *bromide of potassium*, that she became familiar with its taste, and could detect its exhibition.

During the summer of 1869 she came under my care. I found her somewhat anæmic and weak, with a normal skin, and correct excretions, but with pretty constant anorexia. She dwelt with careful minuteness upon the most trivial symptoms, in spite of her expressed fear that she was taking up too much of the doctor's time. She was never satisfied that she had told the whole story, or that she had not

made some remark that would mislead the physician ; and she would follow the latter to the door, into the street, and sometimes quite to his office, to make further explanations. She had displayed great indecision, in the first instance, as to employing me. She seemed at all times very anxious to do so ; yet, when I was ready to attend her, she would propose to wait, and try first the effect of travel and change of scene. In a short time, however, at her urgent request, I would be recalled, to go through the same scene of hesitation.

When, finally, I prescribed, she refused to take the medicine, and it was only by threatening to resign the case entirely that I succeeded in placing her for some months under the use of phosphate of iron, quinia, and strychnia. Finding no improvement to result from this treatment, I commenced in November, 1869, after consulting Prof. Hammond, the use of bromide of potassium, prescribing ninety grains per day for two days, and thereafter diminishing the doses by half. The effect of this was to restrain her wildness, but it did not prevent her from frequently being very troublesome.

On the 21st of November, 1869, by dint of strategy, I brought her to the office of Prof. Hammond, who made an ophthalmoscopic examination, with the following observations :

Retinal vessels, especially the veins, enlarged, tortuous, and increased in number. He was of the opinion that there was a condition of passive cerebral congestion present, and that there was a strong hysterical diathesis existing in the patient.

The treatment during this and the following month was mapped out by Prof. Hammond, who ordered thirty grains of hydrate of chloral three times a day for two days, to be followed by thirty-grain doses of bromide of potassium. Of the chloral, the patient did not take the full amount prescribed, as some of the doses were wasted. During December, she submitted to a seton in the nape of the neck. The oxide of zinc was also administered in the quantity of eight grains per day, during ten months. The bromide was continued ; but, as she seemed gradually to improve, the dose was reduced to eighteen grains, fifteen grains, and, in February, to ten grains, three times daily. Beyond the latter point it could not be diminished, without allowing the patient to become seriously trouble-

some. Any unusual excitement or interference with her opportunities for sleep would render larger doses necessary.

About the middle of October, 1870, the circumstances attending the death of a relative threw her into a state of excitement so nearly approaching that which she had suffered during the previous fall, as to suggest the repetition of the chloral. When I saw her she was strongly under the influence of the bromide, of which she had taken, on the 19th of October, one hundred and fifteen grains. On the 21st the bromide was stopped, and the chloral hydrate prescribed in thirty-grain doses. The medicine was put up by a first-class city house, and, as it happened, in my own presence. In the administration, a small portion of each (a tablespoonful) dose was spilled. Six doses were administered, as follows: On the 21st, at 5.30 P. M.; on the 21st, at 11 P. M.; on the 22d, at 10 A. M., and 3 P. M. (in two portions); on the 23d, at 1 A. M.; on the 23d, at 8.10 A. M.; on the 23d, at 1.30 P. M.

I visited her on the 22d, about 1 P. M. She was then sleeping quietly, with a somewhat rapid pulse. On the 23d, about 7 A. M., I found her in about the same condition, and again, at 6 P. M., she was still sleeping. On the morning of the 24th, alarmed at her continued slumber, I began efforts to awaken her. The pulse was now about 108, and the respirations 27. Pupils moderately contracted. She responded to our efforts to arouse her, by groaning, and occasionally opening her eyes, and making brief and futile attempts at articulation. The loudest call could not elicit a response without an accompanying shake. Upon being raised up in bed she expressed, by impatient contortions of the face, great discomfort, yet still slept on, the head dropping on the breast. During the day (24th), and following night, I remained with her, and endeavored, by frequent changes in the posture and irritation of the surface, and by the application of ammonia to the nostrils, to awaken her. Subcutaneous injection of sulphate of strychnia was performed in one-thirtieth-grain doses, at eight, twelve, and four o'clock during the night. Up to the last-named hour her condition remained apparently stationary. The breathing 28 to 30 per minute—sometimes stertorous, but for the most part quiet, except as disturbed by catarrhal accumulations in the

fauces. Nostrils faintly sensitive to the ammonia. Pulse 108 to 110, strong, but not full. Pupils contracted. Conjunctiva responding to the touch. Head and extremities warm; skin soft and open. Voluntary motion of the limbs, hardly perceptible through the day, increased in frequency and extent during the night. About 4 A. M., on the 25th, a marked change occurred. The respirations became feebler and more rapid; the pulse weakened and rose to 120 per minute, and the temperature of the head slightly diminished. At 7 A. M., when I brought Prof. Hammond to see her, she was manifestly moribund. The pulse had reached 140; the respirations were rapid and stertorous, the cheeks blowing, and the *alæ nasi* dilating at each breath. A blister was applied to the vertex, and mustard to the soles of the feet; but the coma thenceforward progressed to the fatal termination of the case, at 3.55 P. M. on the 25th.

The autopsy was made by Dr. T. M. B. Cross, Resident Physician of the New York State Hospital for Diseases of the Nervous System, whose report I herewith append:

*“Post-mortem Appearances Six Hours after Death.—*The head was well formed and symmetrical. On opening the calvarium, its inner surface was found to be very uneven, while the grooves for the middle meningeal arteries were unusually deep and tortuous; this was especially the case with the right middle meningeal artery. The dura mater was easily detached from the skull, and the longitudinal sinus was replete with blood. The dura mater having been divided, and the arachnoid brought to view, there was discovered no thickening, nor other traces of previous inflammation, nor was there any separation of its layers. The Pacchionian bodies were large, and extended along either side of the longitudinal fissure for at least three inches, and here the arachnoid was opaque, and very adherent to the dura mater.

“The vessels of the pia mater were enormously enlarged and gorged with blood, and there were very many more of them visible than are seen in a normal brain. In the meshes of this vascular membrane there was infiltrated a sero-gelatinous exudation, more marked along the course of the arteries and veins than elsewhere, and which appeared to be in the arachnoid, but this was not the case. The cerebrum was next

examined, and it presented a perfectly firm and natural consistency, if we except the undue excess of blood which pervaded its structure. There was no softening nor tendency to softening whatever. The ventricles were entirely devoid of serum, and much more dry than is usual when in a healthy state. Sections were now made through both the cerebrum and cerebellum, to reveal nothing abnormal but the great increase in the size and the number of the arterioles and veinules of the perivascular tissue of these organs. In the white substance the puncta vasculosa were very numerous and distinct, while the gray substance seemed to be much darker than natural, but this was undoubtedly owing to the extreme hyperæmia.

"The pons varolii was surrounded by such a plexus of capillaries that its tissue proper could hardly be distinguished. All the sinuses of the brain were, like the longitudinal, completely filled with blood. The ganglia, crura, choroid plexuses, nerves, and all the other parts, were carefully observed, but they were only much more vascular than they normally would have been. The blood, which was very dark-colored, was more or less coagulated in all the vessels throughout the whole encephalon, but there was no rupture in any of them, and consequently no extravasation. There had accumulated at the base of the cranium during the autopsy, however, about four fluid ounces of very dark venous blood. No microscopic examination of the brain-tissue was made, nor were any other internal organs inspected, as permission was not granted by the family."

I had occasionally explored the patient's chest during the early part of her illness, never discovering any lesion; and felt so sure that no organic thoracic disease existed, that at the *post mortem* I opposed opening the chest. I now regret, however, that the heart was not examined, especially as other counsel (though how reliable I know not) had declared the existence of cardiac trouble. If such complication had been found, the congestion would have been more easily explained.

As it stands, this case certainly teaches that the administration of chloral should, at present, be attended with especial circumspection; and that it cannot be too strongly im-

pressed upon attendants that a new dose should never be given while the patient is sufficiently under the influence of the last to sleep profoundly. That I had cumulative effects of the drug, however, seems to be in opposition to its supposed action by the development of a volatile anæsthetic (chloroform) in the blood.

The conviction that the final doses of the hydrate were either too large or too frequent, is that which has led me to the publication of the case; but an important corollate moral is also to be drawn from the fact that those doses were *authoritative*. Great caution should be used by experimenters in publishing the posology of new remedies; since practitioners who lack tentative judgment are apt to rely too implicitly upon such dicta. "For adults," says Dr. B. W. Richardson, in his admirable monograph on the *Hydrate of Chloral*, "if short intervals of sleep are required, from twenty-five to thirty grains may be administered, and may be repeated every two or three hours, by which a safe and continuous action may be maintained. In cases where more determinate effects are demanded, from one to two drachms may be given at once."¹ As large doses as these are pronounced safe by many other observers; and it is well known they are frequently administered without danger. The largest quantity of the drug ever ingested by a human being was probably that reported by Dr. Eshelman, of the Philadelphia Hospital, in the second number of the *Philadelphia Medical Times*. Four hundred and sixty grains are believed to have been taken by a woman. Recovery was accomplished, but immediate and very energetic measures were adopted to counteract the coma.

I am far from believing, however, that my patient was this autumn nearly as tolerant of the hydrate as she was last year, when she must have taken about the same quantity within the same period of time. It seems to me not unlikely that it will be found to be dangerous to administer the full dose of chloral, immediately after the suspension of a long course of bromide of potassium; since the power of the latter to contract the cerebral vessels must tend to diminish their natural contractility, and the reaction therefrom may allow of so great an

¹ Medical Times and Gazette, November 6, 1869, p. 537.

increase of the normal primary effect of the chloral as to produce fatal congestion, to the exclusion of the secondary effects of the hydrate, which, as Hammond's experiments would prove, is anæmia cerebri. The case, among those I have seen recorded, which is nearest to a parallel with the above, is that reported by Prof. Hammond, of an epileptic boy, aged thirteen, who took, with benefit, seventy-five grains daily of the hydrate for fifteen days. He had been previously treated with the bromide of potassium, but I know not how long before, nor to what extent.

It should have been mentioned that the patient was out of bed, and moving around the room, on the evening of the 22d, before taking the fourth dose of the medicine; also that, upon the occasion of my visit on the morning of the 23d, she partially roused and seemed about to awake.

CONTEMPORARY LITERATURE.

M. LOUIS FIGUIER¹ has presented us with an attractive summary of the main facts of the new science of prehistoric archæology. His illustrations are mainly drawn from French sources; but the Swiss lakes and the Scandinavian tombs are fully represented by numerous figures.

Following Lartet, the author divides his subject into the history of the stone-age and that of the age of metals. The former is further divided into the epoch of extinct animals, that of migrated existing animals (or the reindeer-epoch), and that of domesticated existing animals (polished-stone epoch). The age of metals, on the other hand, is divided into the bronze-epoch and the iron-epoch.

Leaving for the present this classification, let us glance at the various sources whence modern zeal has gleaned relics of primitive man.

First of all, man inhabited caves; and it is in caves that we find the earliest tokens of his presence. Of considerable importance are the kitchen-middens, or shell-heaps, of Denmark and other countries. The lake-dwellings have furnished abundant tokens of man's primitive skill.

¹ Primitive Man. By Louis Figuier. Revised Translation. Illustrated with Thirty Scenes of Primitive Life, and Two Hundred and Thirty-three Figures of Objects belonging to Prehistoric Ages. New York: D. Appleton & Co., 1870. 8vo, pp. 348.

Tumuli, and the structures classed as megalithic, have proved mines of human relics and human bones. The various deposits of drift and alluvium, as well as the peat-bogs, furnish another source of supply.

The cave of Aurignac, in the Department of Haute-Garonne, is one of the most remarkable of its class. It was discovered by accident in 1842, by a laborer, whose curiosity induced him to thrust his pick into a hole in the side of a hill, whence he drew out a large stone. Eager to probe the mystery, he dug into the earth until he reached a great slab of sandstone placed in a vertical position, and closing the opening by a large, arched opening. Behind this slab was a cave, containing the remains of seventeen human skeletons, which were carefully interred in the village cemetery, and the place of their interment forgotten. Eight years after, in 1860, M. Lartel visited the spot, and made a thorough examination of the remaining contents of the cave. A layer of "made ground," two feet thick, covered its floor. In this layer he found some human remains; bones of mammals in good preservation and without marks; flint knives, and carved reindeer-horns. In the center of the cave there was a kind of flat spot, which had afterward been covered with earth that had fallen down from the top of the hill. Upon this, at the level of the floor of the cavern, was discovered another deposit, containing bones, and under this a bed of ashes and charcoal, from five to seven inches thick. In this deposit an immense number of the most interesting relics were discovered—a large number of the teeth and broken bones of herbivorous animals; a hundred flint knives; two chipped flints, which are believed to be sling-pieces; a rounded pebble, probably used to flake off flint-knives; a large quantity of implements made of reindeer's horn, of the most varied shapes, including arrow-heads, bodkins, and blades of various sizes. Of the bones of animals found outside of the cave, many had been partly burnt, and all those containing marrow had been broken lengthwise. The inference was plain. Here was a primitive hearth where the ancestors (?) of the modern Europeans had feasted upon the flesh and marrow of many animals now extinct. The human skeletons found within the cave had certainly been interred there; their survivors had feasted at their funerals, and had laid beside them, in the cave, the bones or flesh of the animals on which they themselves were feasting, together with certain objects of value.

The bones of six extinct species of mammals were found at this locality; the great cave-bear (*Ursus spelæus*), the mammoth (*Elephas primigenius*), the rhinoceros (*H. tichorinus*), the great cave-lion (

spelæa), the cave-hyena (*H. spelæa*), and the gigantic stag (*Megaceros Hibernicus*), besides the bison, the reindeer, the stag, the horse, the ass, the roe, the wild-boar, the fox, the wolf, the wild-cat, the badger, and the polecat. Of all the extinct species proved to have been contemporary with man, the cave-bear was the first to disappear. This burial-place, therefore, dates back to the earliest antiquity. It was certainly anterior to the European diluvial period, since the latter contains no bones of this quadruped.

In one of the caverns of the Department of Ariège a stone was found, bearing a tolerably accurate sketch of the great cave-bear. This is the earliest trace of the art of drawing.

Great numbers of caves, containing human relics, have been discovered in France, England, Germany, Switzerland, and the countries bordering upon the Mediterranean. Schmerling has made valuable discoveries, in Belgium, of caverns containing human bones and relics, associated with bones of extinct and living species of animals, which were doubtless deposited there by the diluvial torrents.

Caves continued to be the frequent habitation of man both during the reindeer-epoch, and that which followed it, called the polished-stone epoch.

Besides caves, there is evidence that overhanging rocks furnished shelter to primitive man, at least during the reindeer-epoch. Such a shelter is afforded by the rock of Bruniquel, which overhangs the ground to the extent of forty-six or forty-nine feet; many primitive relics were found on this spot.

The kitchen-middens (*kjökken-möddinger*) of the Danish coast are heaps of sea-shells and bones of fishes, birds, and mammals; primitive rubbish-heaps, in fact, from three to ten feet thick, and sometimes hundreds of feet in length and breadth. They have been carefully explored by order of the government, and found to contain very rude flint instruments, stones adapted for sinkers for nets, and skewers suitable for fish-hooks. Of the mammalian bones, ninety-seven hundredths are those of the stag, the roe, and the bear. Similar collections of shells have been explored in many parts of the world.

The lacustrine dwellings (*pfahlbauten, palafittes*) owe their discovery to what may be termed accident. The winter of 1853-'54, in Switzerland, was so cold and dry, that the waters of the lakes fell far below their ordinary level. The inhabitants of Meilen, on the banks of the Lake of Zürich, took advantage of this circumstance, and gained from the lake a tract of ground, which they set to work to raise and surround with banks. In carrying out these works they found in the

inud at the bottom of the lake a number of piles, some thrown down and others still upright, fragments of rough pottery, bone and stone instruments, and various other relics. To Dr. Keller is due the honor of first recognizing the import of these remains. Since he made known his researches, about one hundred and fifty ruined villages have been rediscovered in the Swiss lakes, and several in peat-bogs which were once the beds of lakes. They furnished shelter to man during a long series of ages; for they represent the polished-stone epoch, the epoch of bronze, and that of iron. Similar pile-dwellings are now used by the inhabitants of parts of the Malay Archipelago, of some of the Pacific islands, and of Venezuela. Subsequent researches have discovered ancient pile-dwellings in Italy, Bavaria, Austria, England, Ireland and elsewhere.

Some of these villages were built upon platforms supported by such piles, while others were placed on heaps of stone, in which large stakes had been fixed for the purpose of giving increased stability. The latter are called *ténevières*, and are in fact artificial islands, like the *crannoges* of Ireland.

The settlement of Morges, one of the largest in the Lake of Geneva, is seventy-one thousand square yards in area. M. Löhle calculates that, in the single lacustrine village of Wangen, in the Lake of Constance, at least forty thousand piles have been driven. M. Troyon estimates the probable population of Morges at twelve hundred and forty-four inhabitants. The numerous tribes that used this sort of dwelling probably chose it for the sake of security against the attacks of more savage tribes; they are believed, from the evidence of articles of weapons found, to have been diminutive in stature. They lived both by fishing and by tilling the soil, and, as has been already said, they finally attained a considerable degree of civilization. As times became peaceable, or, as they came to use metal weapons, they built dwellings on the shore, and used the pile-habitations as magazines for grain. They may, very likely, be the ancestors of some of the present Swiss population. Keller informs us that, during the last century, there still existed on the river Limmat, near Zürich, some fishermen's huts, built in a similar way to those of the lacustrine villages.

More mysterious, perhaps more ancient, than the lake-dwellings are the megalithic erections found in every quarter of the globe, and formerly believed to have served as temples and altars of the Druidical religion. It is inconceivable how men, with the insignificant resources we suppose them to have possessed, could have raised the enormous though unshapen masses of stone called dolmens, crom-

lechs, and menhirs. "Dolmens," says the author, "are monuments composed of a great block or slab of rock, more or less flat in their shape, according to the country in which they are situate, placed horizontally on a certain number of stones which are reared up perpendicularly to serve as its supports. They were originally covered with earth, and served as tombs. At least, many of them were thus covered; and some may now be observed standing partly buried in the remains of their mounds." A variety of these monuments, called by Sir J. Lubbock passage-graves (*gang-graben*), were also probably covered by earth; they consist of a long series of upright stones covered by horizontal ones. Menhirs (upright single stones) and cromlechs (circles of menhirs) are extraordinary objects; at Carnac, in Brittany, thousands of gigantic menhirs stand in rows, extending over a distance of eleven hundred yards.

The Danish dolmens have been the object of careful investigation. The number of skeletons found in them varies much: in the largest there are as many as twenty, and in the smallest not more than five; and they are always in a crouching attitude. Human bones, showing the marks of fire, have been found in one. In that of Hielm, in the Island of Moen, opened in 1853, there were found twenty-two spear-heads, varying from five and a half to eleven inches in length; more than forty flint flakes or knives from two to five inches in length; three flat hatchets, and one rather thicker; three carpenter's chisels, the longest of which measured eight inches; a finely-made hammer five inches long; three flint nuclei (lumps from which knives were formed by splitting) exactly similar to those found in the kitchen-middens; and, lastly, some amber beads, and forty earthen vessels moulded by the hand. The sepulchral chamber was sixteen and a half feet in length, eleven and a half feet in width, and four and a half feet in height. The tumulus of Axevalle, in Sweden, contained twenty tombs of an almost cubical form, each containing a skeleton in a contracted attitude. That of Luttra, near the former, contained hundreds of skeletons, placed in four rows one upon another.

Dolmens and tumuli-dolmens belong to the polished-stone epoch, and the commencement of the age of bronze. The stone implements found in the Northern tombs are of a remarkably fine shape and finish. As society improved, the use, first of wooden roofs, then of wooden coffins, was introduced, and finally the bodies were incinerated before interment. These changes were made during the bronze-age.

Mankind has the almost universal custom of shaping the burial-place of the dead in imitation of the dwellings of the living. A rec-

ollection of this fact enables us to solve the riddle of so many North—
ern “tombs” without occupants; they are doubtless dwellings, and
their construction reminds us very strongly of the huts of the Esqui—
maux.

To return, now, to the division of prehistoric time into epochs—
The earliest antiquity which we are positively able to ascribe to man
is an age when the cave-bear was still living. Whether the relics said
to have been found in the Miocene and Pliocene are positive proof of
man's existence in those early periods, is somewhat doubtful. The
thousands of years, during which man has lived on this planet, must
remain at present unnumbered; but we are at least able to connect
man with certain geologic and palæontologic eras. One of these eras
is marked by the appearance of great herds of reindeer, and, neces—
sarily, by the existence of a climate, in Central Europe, resembling
that of Northern Scandinavia at the present day. These animals were
in existence at the earliest period, along with the great bear, the mam—
moth, and other now extinct animals; but the disappearance, first of
the great cave-bear, next of the mammoth, and rhinoceros, was accom—
panied, it would seem, with a great increase in the number of the rein—
deer; and the latter circumstance, taken in connection with a manifest
improvement in man's intelligence and skill, is thought sufficient to
characterize an epoch. The reindeer, the horse, the bison (*Biso Euro—
pæus*), the urus (*Bos primigenius*), the musk-ox (*Ovibos moschatus*),
the elk, the deer, the chamois, the ibex, and various species of rodents,
among them the beaver, the hamster, the lemming, the spermophilus,
etc., were among the characteristic mammalia of this, the second pe—
riod of man's progress.

A third period is marked by increased mildness of temperature,
and the disappearance of the reindeer and bison. The character of
the stone implements found is improved; men begin to polish them;
and this circumstance has given a name to the epoch. And, finally, the
inventions of bronze, and of iron, furnish points to mark the two
latest eras.

Flint instruments, used as knives, poniards, hatchets, saws, lance—
heads, arrow-heads, scrapers, were nearly the sole mechanical resource
of the earliest ages. The reindeer's horn furnished material for some
implements, such as needles, but we find few articles in bone, compared
with the variety and quantity of those of the subsequent period (rein—
deer-epoch). The flint instruments found in the kitchen-middens are
in general of a very imperfect type, with the exception of the long
knives or splinters, the workmanship of which indicates a considerable

degree of skill. The author, however, without stating his reasons, assigns the shell-heaps to the age of polished stone. The most primitive tools can hardly be recognized as any thing but ordinary pebbles; while those of the polished-stone epoch present various ingenious, often elegant forms, showing that, after unknown thousands of years, Europe had at last attained a civilization parallel to that of our modern North American Indians and Esquimaux. We know how the stone tools were polished, for large blocks of stone have been found, bearing the plainest evidence of having been used to rub the small stones upon. Flint was not the only material used; we find tools of gneiss, diorite, ophite, fibrolite, jade, serpentine, or other hard stones, which require an amount of labor in their manufacture, a degree of patience as well as skill, which place their makers far in advance of the more primitive men.

These people, as far as we know, all buried their dead—that is to say, unless they sometimes ate or sacrificed them. Like modern savages, they put objects of great value beside the corpses, and probably also joints of meat, “to serve them on their journey.” What degree of religious belief may be inferred from these facts is doubtful; the imagination is at liberty to suggest fetichism, atheism, polytheism, or any thing else. Their fine arts, in the earliest period, extended to the delineation of the cave-bear upon a bit of stone, and the engraving of figures of animals on long rods of reindeer’s horn. They possessed necklaces, made of shells strung together, and a few other ornamental articles. What they made out of such perishable materials as skins, sinew, fur, wood, bark, or fibre, is unknown.

Commerce, to a certain extent, is known to have existed in the reindeer-epoch. This is proved by the discovery of shells in the cave of Chaleux, in Belgium, which must have been brought from Champagne. Certain spots seemed to have served as manufactories on a large scale for instruments of flint or horn. Their pottery, implements for hunting, and carved and engraved pieces of bone, prove that the men of this age were superior to their predecessors.

In regard to the primitive type of man, the author cites many contradictory statements from different *savants*, with the sage moral, “Who shall decide when doctors disagree?” His own belief is, that the Neanderthal skull “differed in no way from the heads belonging to the Celts of historic times,” whom the French are proud to call their ancestors (p. 82). The former flint-workers in the Departments of Indre and Loire-et-Cher, are declared to be the descendants of the workmen of the stone-age; and the travelling tinkers of Languedoc

are nothing but the descendants of similar metal-workers of the prehistoric bronze-epoch (pp. 156, 213). It were to be wished that he had given the proof of these statements. He has himself shown good sense in his remarks on "the quicksand on which anthropologists too often make shipwreck," that is to say, inferences made from too limited evidence. "What deduction can be logically drawn from the examination of one single skull? None whatever! *Testis unus testis nullus!*"

The accounts of the lacustrine settlements are very good; the megalithic constructions also receive due attention.

There is abundant evidence that agriculture was practised by the men of the polished-stone epoch.

A quotation of five pages from Mortillet gives an interesting account of the canoes used by this people. As a matter of course, the lake-dwellers were fishermen; and, by a singular accident, some specimens of their nets have been preserved, not to speak of great numbers of the perforated stones used as sinkers, and the two-pointed skewers used as hooks.

The ancient bronze is a compound of tin and copper, combined with singular uniformity, in the proportion of very nearly one to seven parts. Its origin is entirely a mystery. Its introduction among the European barbarians is ascribed by Nilsson and Cornwall Lewis to Phœnician merchants. Certain it is that there existed regular routes for commerce at early periods across the Alps. But the native ingenuity of the Northern tribes soon adopted the idea of casting bronze, and the weapons of Scandinavia exhibit proofs not simply of derivation but of original design; the distinction between them and Etruscan or Greek swords being quite decided. In Switzerland and Germany stone moulds have been found belonging to prehistoric times adapted to casting swords. A cut is given, representing a stone hatchet-mould found in Ireland. A vast variety of useful, even elegant objects in bronze have been found in the Swiss lakes; as chisels, fish-hooks, and knives, shaped like modern implements; and hammers, axes, sickles, bracelets, hair-pins, rings, needles, bodkins, razors, and rings, often of decidedly elegant design. The hatchets, or celts, are from four to eight inches in length, and weigh from ten to twenty-four ounces. Their shapes are varied; but all possess the distinctive characteristic of being adapted to fit longitudinally on their handles, and not transversely, as in the stone-age. It is but seldom that they are not furnished with a hole or ear, so as to furnish an additional means of attachment. The most prevalent type has wings bent round each side of the blade, so as to constitute a socket; the handle was bent.

To use the author's words (p. 269): "We know that the primitive inhabitants of Switzerland dwelt in wooden villages built on lakes; that they were hunters, fishers, shepherds, and husbandmen; that they cultivated wheat, barley, and oats; that they brought into a state of servitude several species of animals, and devoted to the requirements of agriculture the sheep and the goat; that they were acquainted with the principal rudiments of the baker's art; that they stored up apples, pears, and other fruits or berries, for the winter, either for their own use or that of their cattle; that they understood the art of weaving and manufacturing flaxen fabrics; that they twisted up cord and mats of bark; and lastly, that, as a material for the manufacture of their implements and weapons, they availed themselves of stone, bronze, animals' bones, and stag's horn."

In the brief description of the iron-epoch, a good account is given of primitive forges. M. Quiquerez has discovered more than four hundred of these in the Bernese Jura, and finds evidence that one of them is four thousand years old. Owing to the imperfection of the furnaces, the quantity of charcoal used must have been quadruple the present consumption for the same results. Bellows were not used. As the Greeks and Romans used the bellows, M. Quiquerez infers that the art of iron-working could not have been introduced by them into Switzerland. The iron-epoch is characterized by the invention of the potter's wheel, and of glass, and the introduction of bronze coinage. The illustrations of the iron-epoch are chiefly drawn from the specimens at Hallstadt, and those taken from the Swiss lakes.

A few pages at the close are given to the description of primitive man in America.

The work of M. Figuier is rich in valuable illustrations taken directly from characteristic objects. The spirited groups supposed to represent primitive man engaged in hunting, fishing, war, and other pursuits, are very effective, and one can afford to be amused at the fancy portraits of the ideal "noble savage," while mentally contrasting the author's descriptions of a poor wretch, half-starved, half-frozen, preyed upon by savage beasts, excessively filthy, suspected of tattooing himself, and believed occasionally to practise cannibalism!

There is serious fault to find with the work itself. It has no index. It is unusually difficult to find the author's actual views upon a given point, for he seldom comes out with the whole story at once. To pick out what he says of unpolished flint, or of craniology, for example, is much the same process as picking out the actual flints from their bed. And the materials seem not only ill arranged, but ill digested. Chap-

ter I. is devoted to an attempt to confute the views held by Huxley, Vogt, and others. After four pages of type, to define his own position he quotes seven from M. de Quatrefages, and triumphantly concludes the chapter by saying that "the most enlightened science declares to us, in unmistakable accents, that species is immutable;" that "the truth, which has been developed at length by M. de Quatrefages in his numerous works, is a definitive and scientific judgment which must decide the question as far as regards any unprejudiced minds." With all respect for the truly learned Professor of Anthropology, his judgment is not "definitive." Figuier loses no opportunity, throughout his book, of emphatically contradicting "the absurd idea, veiled under grand scientific phrases, of our *simial* origin." (*Vide* p. 183.) There is not room, in a work on archæology, for a fair discussion of such question; and the author gives ground for doubt as to whether he fairly grasps the subject.

On page 21, man's first appearance is declared to have occurred during the quarternary period, subsequent to the pliocene. In Chapter II. his wretched state during the glacial period, without fire or weapons, is described. When the ice retired, a new *fauna* made its appearance, the previous one having been annihilated in the glacial cataclysm. This new *fauna* includes the cave-bear and his congeners. Now man begins to advance; he discovers fire, and invents flint weapons. Does the author mean to say that man lived through the "deadly cold" of the glacial period without fire? And what are the names of the animals composing the *fauna* which was his contemporary, during a part of the glacial period, but which succumbed to the inclement weather? Hardly an allusion is made to the glacial theory of the origin of the Drift; the latter is said to have been caused by the violent flowing of rushing water, and is separated from the glacial period by the entire epochs of the cave-bear and the reindeer.

The book is translated into good, readable English. But in justice to M. Figuier it must be said that he is not always chargeable with the statements that appear in the translation. On page 40, lines 16-18 there appears a sort of *bull*, not in the original. On page 85 we read "Created beings diminish in size as they improve in type." This unfair translation is capable of being held up as a specimen of *ras* unfounded generalization; while from the context it is clear that the author simply alludes to the fact that many large quadrupeds pass from sight at the commencement of the reindeer-epoch; after enumerating them, he says that "*La nature s'amoin*drit en se perfectionnant;" "Nature dwindles while undergoing the process of improvement.

On page 248, celts measuring from 4 to 8 inches in length are said to weigh from 10 to 15 *pounds*! The original reads "300 à 750 *grammes*," which equals pretty nearly "10 à 26 *onces avoirdupois*."

In spite of inexcusable defects, the work is an attractive introduction to the science, as yet scarcely formed, of primitive archæology. It contains excellent and vivid descriptions of many remarkable objects. Confined, as it is, mainly to the description of French, Swiss, and Danish antiquities, it may serve as a useful stimulus to further reading in English and German authors—not to mention the French, who deserve reading best of all. The subject is eminently worthy of popularity.

THE object of Sir John Lubbock's work¹ is to furnish proof that the primitive condition of the entire human race was one of utter barbarism, from which, by a process of gradual development, certain portions of the race have attained their present degree of civilization. In support of this theory, the author has gathered a vast array of facts and statements regarding the character, the customs, and the mental and moral condition of savages, in all countries and in all ages. Care has been taken to avoid, as far as possible, the many sources of error incident to investigations in which so much depends on the mere testimony of travellers, who, where they have not misrepresented or exaggerated facts, have often wholly failed to comprehend the mental and moral *status* of the races they have described. Hence the author admits that our information with reference to the moral condition of the lower races is "very far from being satisfactory either in extent or in accuracy." Nevertheless, by patient and methodical research, he has succeeded in throwing much light on an obscure subject, and has furnished the material for much interesting speculation. One point to which attention is directed in the opening chapter is the striking similarity that exists between similar stages of development in totally different races, as shown by comparing the accounts of different travellers. Certain curious ideas and fantastic customs are found to be widely distributed. For instance, among the American Indians of the far North, a woman is absolutely forbidden to hold any communication with her son-in-law. The same custom exists, according to various travellers, in South America, in China, in Central Africa, and among the savage races in many other parts of the world. A still more curious custom,

¹ *The Origin of Civilization and the Primitive Condition of Man, Mental and Social Condition of Savages.* By Sir John Lubbock, Bart., M. P., F. R. S., Author of "Prehistoric Times," etc.; Vice-President of the Ethnological Society; Fellow of the Linnæan, Geological, Entomological, and other Societies. New York: D. Appleton & Co., 1870.

and one also widely distributed, is that of putting the husband to bed on the birth of a child, and treating him with all the care usually bestowed upon the mother. Yet this singular custom is said by travellers to exist among certain tribes in Brazil, Guiana, and other parts of South America, in Greenland, in some parts of China, among the Dyaks of Borneo, and, in a modified form, in Corsica and in the north of Spain. Sir John Lubbock differs from other writers who have considered this wide-spread uniformity of customs an evidence that the races practising them belong to one variety of the human species. On the contrary, he believes such customs to originate in some idea which satisfies the savage mind; and that the savage mind, at given periods of its growth, is essentially the same in all races.

In a brief but comprehensive review of the characteristics of savage races, some space is devoted to their taste for ornament and their humble attainments in art. Illustrations are given of works of art of an earlier date than any of the Egyptian statues or Assyrian monuments, yet showing considerable skill in the delineation of animals. In this connection it is remarked that, while very fair drawings of animals are found in the stone age, throughout the bronze age such drawings are almost entirely wanting, and that the ornamentation of that period is confined to combinations of curved and straight lines and geometrical patterns. This is believed to imply a difference of race in the population of Western Europe at those different periods. As a parallel case, it is stated that the Esquimaux, at the present day, are very fair draughtsmen, and fond of representing men and animals; while the Polynesians, more advanced in many other respects, have very little skill in drawing animals, though they excel in geometrical decorations. But, though some very savage tribes, in very ancient times, had a respectable skill in art, there are other tribes existing to-day who seem quite unable to appreciate the most vivid artistic representations. Some of the Australian tribes, it is said, utterly fail to recognize the purpose of drawing. One traveller showed them a large colored engraving of an aboriginal New-Hollander, which some declared to be a ship, others a kangaroo, etc. It seems probable that no race of men in the stone-age had attained the art of communicating with each other by means of letters or picture-writing. Even the Peruvians had nothing better for that purpose than a cord, to which knotted strings were attached. The same device was used in China before the commencement of the monarchy. Something very similar is employed in West Africa; and the author suggests that our custom of tying a knot in the pocket-handkerchief may be the lineal representative of this ancient

mode of assisting the memory. Picture-writing was a step in advance, and was very generally used among the North-American Indians. The same races used many simple devices on the grave-posts of their chiefs to record their deeds. The taste of savage nations for art is shown also in their tattooing, and in the jewels and various ornaments with which they decorate their persons. The Feejeeans give a great deal of time and attention to their hair, and most of the chiefs employ a special hairdresser, to whom they sometimes devote several hours a day.

The most interesting and instructive chapter in the book is that on "Marriage and Relationship." "Nothing," says the author, "gives a more instructive insight into the true condition of savages than their ideas on relationship and marriage; nor can the great advantages of civilization be more conclusively proved than by the improvement which it has effected in the relation between the two sexes." The lowest races have, it appears, no institution of marriage whatever. Many savage tribes have no word for "dear" or "love," nor have they any conception of the meaning of those words. Marriage in Central Africa is simply a matter of convenience, or at best but a form of regulated slavery. The same is said to be true of the Hill tribes in India, of the Guyacurus of Paraguay, of the Samoyedes in Siberia, and of many other savage races. In Australia the women are treated with the utmost brutality, and wives are regarded simply as slaves-of-all-work. The family feeling that we experience, and which leads us to regard a child as equally related to father and mother, seems to be altogether a matter of growth, and does not exist among savages. Sir John finds reasons for concluding that a man was at first regarded as merely related to his family; after that he was thought to belong to his mother, but not to his father; then to his father and not to his mother; and only at last to both father and mother. Of the various forms of marriage described, one of the most curious is that prevailing among the Reddies of Southern India, by which a young woman of sixteen or twenty may be married to a boy of five or six. She is allowed to live with some adult male, and the children are fathered on the boy-husband. When the boy grows up, he in turn takes some other boy's wife, and his children are assigned to the boy-husband. Polygamy is almost universal among the lower races of men, and polyandry, or the marriage of one woman to several men, is said to be much more common than is generally supposed. Among nearly all the savage races who have any form of marriage, the husband is not allowed to live with his wife for some time after marriage, and can only visit her by stealth. Many races have no word to express mar-

riage, and the Hottentot language has no means of distinguishing married woman from an unmarried girl. Yet the author cautions that it must not be assumed that marriage is always lightly regarded because little or no ceremonial accompanies it. According to Captain Cook, the married women in Tahiti were as faithful to their husbands as women in any other part of the world. A difference should be drawn between "lax" and "brittle" marriages. In some countries the marriage tie is strictly respected while it lasts, but may be broken with the greatest ease, while in other countries the very reverse is the case. Many of the marriage ceremonies among savages are revolting; others are curious and symbolic. In some countries it is customary for man and wife to live together until the first child is weaned, when they separate, and each takes a new partner. Other tribes, as the Bushmen of South Africa, and the Teehurs of Oude, live together indiscriminately in large communities. Among the Todas of the Neilgherry Hills when a man marries a girl she becomes the wife of all his brothers as they successively reach manhood, and they also become the husbands of all her sisters as they become old enough to marry. The author discusses at considerable length the custom of marriage by capture, which prevails so generally among all but civilized races. He is of opinion that communal marriage was gradually superseded by individual marriage founded on capture, and that this led firstly to exogamy and then to female infanticide. Endogamy and regulated polyandry he regards as exceptional, though frequent, and as not entering into the normal process of development.

Three chapters are devoted to the religion of savages, though the author admits at the outset that it constitutes the most difficult part of his subject. He felt doubtful whether the chapters ought not to be entitled "superstitions" rather than "religions," for religion, as understood by savages, not only differs essentially from our religion, but is directly opposite to it. Their deities are evil, they are mortal, they exercise malign influences, and often approve of what we esteem vicious. The true classification of religion the author believes to be based on the estimate in which the Deity is held. The first stages of religious belief he regards as follows:

"*Atheism* ; understanding, by this term, not the denial of the existence of a Deity, but an absence of any definite ideas on the subject."

"*Fetichism* ; the stage in which man supposes he can force the Deity to comply with his desires."

"*Nature-worship*, or *totemism* ; in which natural objects, trees, lakes, stones, animals, etc., are worshipped."

Shamanism; in which the superior deities are far more powerful than man and of a different nature. Their place of abode also is far away and accessible only to Shamans.

"*Idolatry*, or anthropomorphism; in which the gods take still more completely the nature of men—being, however, more powerful. They are still amenable to persuasion; they are a part of Nature, and not creators. They are represented by images or idols."

In the next stage Deity is regarded as the author of Nature, and becomes a really supernatural being. The last stage to which the author refers is that in which morality is associated with religion. Religion is not general among all savages. Many trustworthy observers concur in stating that there are many races totally devoid of religion. Such was the condition of the Californians previous to their conversion to Christianity. Many curious instances are given of the exceedingly crude ideas held by savages on the subject of gods, immortality, death, magic, devils, etc. Many races seem to be entirely destitute of any ideas regarding a future life, though they believe in mortal ghosts. Witchcraft is said to flourish in some form among nearly all savage races. Some account is given of the dance as a part of the religious ceremonies of savages, which in America also included smoking. Among the Sonthials of India, the whole of their religious observances are performed by votaries in a state of intoxication. The crudest forms of religion are found among the Australians, and cannot be said to have any connection with morality. The words "good" and "bad" pertain only to bodily comfort, and convey no idea of right or wrong. One of their singular notions is, that white men are blacks who have risen from the dead. The various religions, if they may be so called, of the savage races, are reviewed and shown to be often antagonistic to morality and the general welfare of the communities who practise them. Fetichism, though essentially different from idolatry, seems to the author to be entirely opposed to the true spirit of religion. He says: "The term fetichism is generally connected with the negro race, but a corresponding state of mind exists in many other parts of the world. In fact, it may almost be said to be universal, since it is nothing more or less than witchcraft." The Chinese manner of treating their gods, when they do not answer their prayers, is somewhat singular. They abuse and reproach them, saying, "How now, dog of a spirit! we give you a lodging in a magnificent temple, we gild you handsomely, feed you well, and offer incense to you; yet, after all this care, you are so ungrateful as to refuse us what we ask of you." Whereupon they tear down the impotent gods, and disgrace them.

The worship of animals is found to have been very common. Serpent-worship especially seems to have been widely distributed, chiefly because serpents exist nearly all over the world, while most of the other animals have less extensive areas. The serpent was frequently regarded as a beneficent being, and typical of youth and health. Until quite recently among the Lithuanians "every family entertained a real serpent as a household god." The worship of trees prevails among several savage nations at the present day, and was formerly very common. Relics of the sentiment lingered until quite recently in Europe, in reverence for sacred trees and groves. The serpent was widely distributed was the worship of lakes, rivers, and springs. Many curious facts are related regarding the sacred stones that have lain in various parts of the world as memorials of the races that have used them in their worship. Some space is devoted also to the worship of the sun, moon, and stars, and many other natural objects. The author calls attention to the modifications of worship, due to physical causes, apart from the difference in race and civilization. Distinct from idolatry and totemism was the practice of Shamanism. The Shamans, supposing themselves inspired by the spirit in which they name they spoke, wrought themselves into an ecstasy, and pretended to know the most hidden secrets, and to be in the confidence of the higher powers. The worship of idols the author believes to characterize a somewhat higher stage of human development than Shamanism, which is satisfied with Shamanism, totemism, or fetichism—idolatry and fetichism have been erroneously confounded. The latter is an attack on the Deity, while idolatry, however rude, is an act of humble submission to Him. Being directly opposite, one could not have developed out of the other, and hence we find a stage of religion without either one or the other. Succeeding idolatry was the belief in spiritual beings, and the endeavor to propitiate them by human and other sacrifices. The lower savages have no temples. It has been shown that the temples in India were gradually developed from the tumulus or burial-mound. The progress of the savage mind is traced through its various stages until at length it comprehends the idea of immortality, and a future state. Among the ancient Britons the belief in a future state was singularly vivid, and among many other barbarous races the same belief is strong enough to enable them to view death with indifference. It is said that, in China, if a rich man is condemned to death, he can always purchase a will substitute at a small expense. The idea of creation is very incomplete, even among the more advanced of the barbarous races.

lower forms of religion are almost independent of prayer,; even where there is some conception of a God, it is generally thought idle for mortals to attempt to reverse His decrees.

In regard to idol-worship and its attendant superstitions, the author calls attention to the great work that has been done by science in the cause of religion and humanity, but which has not yet received the recognition it deserves. "The time, however," he says, "is approaching when it will be generally perceived that, so far from science being opposed to religion, true religion is without science impossible; and if we consider the various aspects of Christianity, as understood by different nations, we can hardly fail to perceive that the dignity and therefore the truth of their religious beliefs is in direct relation to the knowledge of science, and of the great physical laws by which our universe is governed."

A brief but interesting chapter treats of the character and morals of the barbarous races. Respecting these qualities much may be inferred from the accounts given of their religions and their marriage relations. Direct accounts of their moral condition are admitted to be both conflicting and unsatisfactory. But there certainly seems to be a wide difference in the standard of morality among different races. Some tribes are said to regard the vices as virtues, and habitually to practise the most abominable crimes. Some observers believe the savage mind may advance vastly in intellectual achievements without any corresponding advance in their moral condition. This the author deems an error, and he is disposed to think that man has made more progress in moral than in either material or intellectual improvement. After giving the opinions of several authorities in regard to the moral sense in the savage mind, the author proceeds to show, on the testimony of many travellers who have observed closely, that the moral condition of savages is really much lower than has been generally supposed. He believes that the lower races may be deficient in any idea of right, though quite familiar with the idea of law. On the whole, he is of opinion that the moral feelings deepen with the growth of a race. External circumstances exercise much influence on character, but we often see the possession of one virtue counterbalanced by some corresponding defect. As an instance, the North-American Indians are mentioned as brave and generous, but also cruel and reckless. Touching the origin of moral feeling, the author is of opinion that if the lower races have no moral perceptions, those perceptions cannot certainly be regarded as natural to man, or strictly intuitive. *Utility*, he believes, in one sense, has been "naturally and yet unconsciously

selected as the basis of morals." As an instance of how much our notions of right and wrong depend on the lessons of youth and on hereditary ideas, he mentions the different moral codes that exist among us at the present day. Even in the same individual two contradictory systems may be seen side by side, as the Christian and the ordinary code of honor—both of which many men support they hold. Authority, then, seems to the author the origin, and until the criterion of virtue.

The inferences drawn from a critical review of the modes of expression among savages are in favor of the gradual growth of language as a thing of human origin, rather than a divine gift, perfect at the beginning. Many curious facts are introduced in this connection, showing the deficiency of the savage mind in the simplest forms of arithmetic, affording melancholy evidence of dormant thought.

A survey of the laws and legal customs, as far as they can be ascertained, of savage races, shows their lives to have been regulated by the most complicated and inconvenient rules. As a general thing, prohibitions apply to the weak and the privileges to the strong. The place of the freedom commonly supposed to exist among savages, it appears that they are the absolute slaves of law, rule, and precedent. All their ceremonies seem subject to strict and cramping formalities, precision being aimed at in the most trivial details. In regard to offences the earliest laws were framed rather with a view to restrain and limit the vengeance of the aggrieved than to punish the offender. Among the Anglo-Saxons a fine for injuries was substituted for personal vengeance, and every part of the body had a fixed value, the amount varying greatly, however, according to the rank of the person injured. There appears to have been no distinction made between intentional and accidental offences in the treatment of criminals; and the author remarks that our criminal courts are still influenced by the ideas of our ancestors in that respect.

The author expresses his belief, in summing up his arguments, that the history of the human race has, on the whole, been one of progress, though he doubts not there have been exceptional cases in which nations or races have fallen back. Nor does he maintain that all races are necessarily advancing. He believes, however, that the retrograding races are dying out, while those which are stationary in condition are stationary also in numbers, and that improving races increase in numbers and encroach on those which are less progressive. He then finds strong grounds for the following conclusions:

"That the primitive condition of man was one of utter barbarism."

"That from this condition several races have independently raised themselves."

Accepting this view, he has reason to hope for still greater improvement in the future, and for the expectation "that the blessings of civilization will not only be extended to other countries and to other nations, but that even in our own land they will be rendered more general and become equable; so that we shall not see before us always, as now, countrymen of our own living in our very midst a life worse than that of a savage; neither enjoying the rough advantages and real, though coarse, pleasures of savage life, nor yet availing themselves of the far higher and more noble opportunities which lie within the reach of civilized man."

The author's method of treating his subject throughout is rather by delineation than by argument. The facts, as he believes them to be, are simply stated, and the reader is generally left to draw his own deductions.

In an appendix to the volume we find the substance of a paper read by the author before the British Association at Dundee, reviewing the opinions of the late Archbishop of Dublin, Dr. Whately; and also the substance of a paper read before the same Association in Exeter, in 1869, in reply to the arguments of the Duke of Argyle, whose opinions regarding the primitive condition of man are entirely opposite to those held by Sir John Lubbock.

In this age of theory and speculation we are glad indeed to welcome a volume which has for its basis solely facts, and especially such an interesting treatise as Mr. Ram¹ has presented to the profession at large; a work which is not only adapted to the legal mind, but one which can be read by every intelligent person with great pleasure and profit.

Although for the first time republished in this country, and perhaps not generally known, except to those versed in the law, a book so admirably and clearly written, teeming with information, and adorned

¹ A Treatise on Facts as Subjects of Inquiry by a Jury. By James Ram, of the Inner Temple, M. A., Cambridge, Barrister-at-Law. Second American edition. By John Townsend, Counsellor-at-Law, with an Appendix containing David Paul Brown's Golden Rules for the Examination of a Witness; Cox's Advice for conducting the Examination of Witnesses and opening a Case to the Jury; Whewell on Theory and Facts; Hoffman's Fifty Resolutions in regard to Professional Deportment. New York: Baker, Voorhis & Company, 66 Nassau Street, 1870. 8vo, pp. 407.

with so many well-selected and *apropos* examples, cannot but be acceptable to the public.

It has rarely been our good fortune to peruse a work upon Law with so much satisfaction, and at the same time, from the happy style in which it is written, to have a more lively interest excited. This book does credit to the publishers for the plain and suitable manner which they have prepared it for the use of the many. It also possesses a great advantage over the original English edition, inasmuch it has passed through the hands of Mr. Townsend, who has edited very cleverly; adding, moreover, a comprehensive index and appended together with copious foot-notes and other valuable improvements.

As all arts and sciences, on the one hand, are subjects of jurisprudence, so, on the other, some subjects of jurisprudence are of necessity embraced in the broad sphere of medicine.

For a physician to properly understand the medico-legal relations involved in a case of insanity, to give evidence as to the testamentary capacity of an individual, in weighing the numerous points which bear upon the cause *pro* or *con*, it is very essential that he should have adequate knowledge of the law.

The main chapters of this volume treat of perception, impression, memory, recognition, of certain facts common in evidence, of suspicion of probability, of narrative of facts, of the credit of a witness, of witness under examination, and of conclusion from facts.

It is not necessary to enter into any discussion in regard to the many facts which have been collected here, for these in the clear light of science alone admit of investigation. We would rather call attention to the number and variety of subjects above mentioned which have been so briefly and lucidly portrayed in their legal aspects in order that the members of the medical as well as of the other professions might profit by the many valuable suggestions contained in *Ram on Facts*. These will no doubt be of aid and assistance to them in correcting many fallacies, and give them a broader view of the certainty of acquiring a correct knowledge in regard to any person or thing, by imparting to them the difficulties which they have to counter in their search after truth.

There is no man, who confines himself exclusively to one branch of science, who does not, as a consequence, limit his mental capacity and there is no fact, however insignificant it may seem, gained from any useful department of knowledge, which at some time in the course of our lives is not of utility. Even in this book there are some chapters which are more or less directly or indirectly connected with psych

ogy, and which on this account will have an especial interest for those engaged in this branch of study and research. They will not be found dry—a reputation which the law has long enjoyed—or devoid of information, but on the contrary very entertaining, and much more like a novel, in many respects, than a collection of facts.

AMONG medical journals of a distinctive and practical character there is no one that we can more heartily commend to our readers than "The Practitioner,"¹ edited by Dr. Francis E. Anstie. Its purpose is to afford to the busy practitioner a special medium for the interchange of ideas respecting the action of remedies; and it has been very successfully carried out. Therapeutics, the main object of medicine, have confessedly been in arrear of diagnosis and pathology. A blind confidence, based on the authority of tradition in certain remedies, or total skepticism in the value of drugs, has of late years divided the profession, to the prejudice of the sick public, and of medicine as an art. Earnest workers, like Dr. Anstie and his collaborators, are endeavoring by trustworthy means to place the treatment of disease on a more certain and rational, if not scientific, basis. The manner in which, during nearly three years, "The Practitioner" has been conducted has largely contributed toward this end. The original contributions have for the most part been valuable, and generally from sources of high authority. We recommend our readers to subscribe to and read this journal, and to order the English edition, which they can do through the publishers' house in New York, at the same price as the shabby American reprint.

AMONG recent American medical journals there are two which especially commend themselves to the attention of the practical physician. First, "The American Practitioner," a journal which stands in the very front rank, and which we are pleased to find under the excellent editorial management of Drs. Yandell and Parvin, of Louisville, Ky., has something else to do than engaging in unseemly and degrading personal controversy. We take pleasure in commending it to our brethren of the West as an honor to their section of the country, and physicians in the East would do well to have it come monthly to their office-tables. It is in every sense of the word a credit to American medical journalism.

¹ "The Practitioner: A Monthly Journal of Therapeutics." Edited by Francis E. Anstie, M. D., F. R. C. P., etc., etc. Macmillan & Co.: London and New York.

The other, "The American Journal of Syphilography and Derrtology," published in New York, supplies a place which has too long gone unfilled. Under the editorship of Dr. Henry, several numbers have been issued, which are full of valuable material. The physician in active practice had much better, in our opinion, lop off some of the weekly newspapers than do without such a medical journal as this which treats fully of subjects he ought to know in all their fresh details.

DR. CLYMER,¹ in the memoir before us, which originally appeared in the NEW YORK MEDICAL JOURNAL, has given a very excellent account of some recent views relative to certain forms of sclerosis affecting the brain and spinal cord. We doubt, however, whether the phenomena mentioned as occurring in the Count de Lordat, through his carriage, were the result of sclerosis of the spinal cord. The brain was probably involved to a considerable extent, and a pathological feature, not referred to by Dr. Clymer, was the enlargement of the medulla oblongata, although he mentions its compactness.

This, however, is a small matter, and we should not refer to it in criticism of an author less careful than Dr. Clymer. His monograph bears every evidence of careful study.

It is rarely the case that we find time to notice the transactions of State societies. There is not often much in them bearing on psychological or neurological medicine, and in the pamphlet before us there is nothing at all. Of all the State Medical Society Transactions,² as many of them are excellent, this is the very worst publication we have seen. We know it does not represent the medical talent of North Carolina, for there are many eminent physicians within her limits. We have no other special remarks to make, except to protest against the views enunciated by Dr. Satchwell. If his opinions are those of the Medical Society of North Carolina, we are glad we do not live where its members could treat us for pneumonia, pleurisy, or other inflammatory affection. We are not seeking a controversy—*le jeu vaut pas la chandelle*. We will only say that Dr. Satchwell's doctrines have long ago been exploded, and we had hoped were no longer entertained outside of Spain or Italy, the countries of all others where physicians with antiquated notions are still to be found.

¹ Notes on the Physiology and Pathology of the Nervous System, with Reference to Clinical Medicine. D. Appleton & Co., New York, 1870.

² Transactions of the Seventeenth Annual Meeting of the Medical Society of the State of North Carolina, 1870.

As a manual,¹ though a very large one to be sure, Dr. Tanner's work has long been known as one of the best issued upon the general practice of medicine. The fact that it has passed through five American and six English editions is sufficient testimony of its usefulness. Without pretending to take the place of such treatises as those of Flint, Aitken, or Niemeyer, it may very advantageously replace the many "compendiums" and other "short cuts" to a knowledge of the science of medicine which abound at the present day. It is especially adapted to the use of junior students as a first work to be put into their hands.

In this sixth edition of Dr. Seguin's Prescription and Clinical Record, the lovers of method and positivism will find a trusty pocket companion. The student of nervous diseases will use the tables prepared to note the effects of electricity and tetanic remedies on the vital functions, and the general practitioner will rejoice at the amount of information that may be accumulated in this book to prepare monographs and statistics.

CHRONICLE.

I.

PHYSIOLOGY AND PATHOLOGY OF THE BRAIN AND NERVOUS SYSTEM.

PREPARED BY DR. D. F. LINCOLN, OF BOSTON.

1.—*The Supra-orbital Convolutions of the Brains of Different Races.* Dr. WEISBACH, of Constantinople. (Medizin. Jahrbücher, XIX. Bd.)

THE material for the author's very minute and elaborate analysis was furnished by 703 fresh human brains, of which drawings were made on the spot. They are classified, according to race, as follows: **Magyars**, 63; Roumanians, 32; Italians, mostly from Venetia, 38; **Slaves** (Czechs, Slovaks, Poles, Ruthenians, Slovenians, Croats), 212 men, 29 women; Germans, 205 men, 124 women.

The convolutions of the inferior surface of the frontal lobe are those intended. They are named the gyrus rectus, lying against the median fissure—g. internus, medius, externus, parallel with the rectus—and g. transversus, at right angles with the other four, and bounding them posteriorly.

The chief point, in the comparison here instituted, is the fact of the closure (disconnection), or the fusion, of these gyri with one another.

¹ *The Practice of Medicine.* Philadelphia: Lindsay & Blakiston, 1870. 8vo. pp. 1200.

In the Slavic brain, as compared with that of the Magyar, the gyrus rectus is found more frequently closed; and in general there are less frequent connections between these convolutions.

In the Slavic brain, as compared with that of the Roumanian, the connections of the rectus and transversus with the internus are more frequent, but those with the medius—as likewise that between the medius and internus—are less frequent.

A distinction between the sexes may be traced in the German brains. In the woman, the connections of the gyrus rectus, and those of the medius with the externus and internus, are more frequent, while those of the transversus are less so, than in man. In Slavic women the same distinction holds good, except in relation to the gyrus rectus, which has less frequent communications than in men.

In all, the brains of 550 men and 153 women were examined; of the latter, 28 had very simple supra-orbital convolutions, 3 very complex; while of the males, in 56 they were very simple, in 33 very complex.

In brief, in women the rectus internus and externus are more often connected with the medius, and the transversus is less frequently connected with its neighbors, than is the case with men.

Fifteen of the men were insane, and their supra-orbital convolutions seem to be characterized by a greater frequency of connection.

In fourteen brains of the lower apes, the inner was not once united with the middle convolution, while the transverse in most cases was united, usually on both sides, furnishing a complete contrast to human analogies.

Seven anthropoid apes had these convolutions much more developed than the lower apes. But, in most of the points here spoken of, they are much nearer to the lower apes than to man.

This part of the human brain may be said to resemble that of the ape, in proportion as the middle is disjoined from the inner convolution, and the transverse united with the middle. These points are set forth in the following table:

Inner convolution isolated, in		Inner and middle united, in		Transverse and middle united, in	
Apes,	71 p. c.	Apes,	0 p. c.	Apes,	71 p. c.
Slaves,	23 "	Slavic women, }	34 "	Germans,	8 "
Roumanians,	22 "	Magyars, }		Roumanians,	7 "
Magyars, }	20 "	Slaves, }	38 "	Magyars,	4 "
Germans, }		Germans, }		Slaves,	3 "
Slavic women,	17 "	Roumanians,	40 "	German women,	1.5 "
German women,	13 "	German women,	47 "	Slavic women,	0 "

Simian analogies would thus seem to be quite unequally distributed among various races. The result seems highly complimentary, however, to *German women*.

The brains were carefully weighed, and divided into four classes, according as they weighed under 1,200, over 1,200, over 1,300, or over 1,400 grammes. In proportion as the weight increased, it was found that the inner, middle, and outer convolutions were more frequently isolated from each other, but the transverse was more frequently united with its neighbors. This analogy between heavy human brains and

those of apes is quite remarkable. Perhaps, in the case of lighter brains, a sort of compensation may be supposed to exist, in the way of increased development of the convolutions.

The effects of *age* are traceable in a direction exactly opposite to that just stated as due to increase of weight.

2.—*Lymphatic Ducts in the Brain.* OBERSTEINER, JR. Verein für Psychiatrie u. forensische Psychologie, in Vienna. (Wochenschrift der k. k. Ges. d. A. No. 38, 1870.)

The first ducts demonstrated in the central nervous lymphatic system were the perivascular spaces discovered by Robin. In sections of the cortical substance it may be observed that the large ganglion-cells, and (less conspicuously) the smaller ones also, are separated from the surrounding mass of neuroglia by spaces, in most of which from one to five or more lymphoid corpuscles are found. Not infrequently we see the perivascular space in direct connection with a neighboring pericellular space; and an injection made into the perivascular spaces (Bahnen) will easily spread around several of the cells. Hence, there exists a fine communication between the pericellular and the perivascular spaces. This circumstance, with the presence of lymphoid bodies in both, induces the author to consider the ganglion-cells of the cortex as lying in a sort of little lymphatic sac; a point which may be of importance in regard to their nutrition.

Meynert, remarking upon the novelty of this view, could not regard it as proved; but, as a confirmation of the existence of such spaces under pathological circumstances, he observed that they were sometimes found full of colloid, even doubly-refracting masses.

3.—*Calcareous Degeneration of Cerebral Cells.* VIRCHOW, WIDERMEISTER, HESCHL. (Virchow's Archiv, 50: 2 and 4. A. M. C.—Z. 47, 1870. Wiener Med. Wochenschrift, 41, 1870.)

Virchow says: "This process of calcification manifestly belongs to that group of phenomena which I formerly described as constituting one of the peculiarities of portions of the internal structure of the human body which have perished. I find, especially in the cortex of the brain, spots where the cells and their diverticula, and in some cases fine nerve-fibres, are calcified; and this is exceedingly common after traumatic lesion of the skull. Sometimes the naked eye can see nothing unusual in such places; sometimes it sees atrophic depressions, the so-called yellow patches (Platten)." In one case reported, the calcified elements appeared on a spot of red softening, but only toward its borders; in the case of thick, brown cicatrices, they lie outside of the cicatricial substance in the surrounding cerebral mass, while in the cicatrix itself all the cells are destroyed. When traces of indentation or fissure were visible on the outside of the skull, Virchow has often found large numbers of the ganglion-cells of the subjacent gray substance calcified, though the gyri appeared uninjured. "This might, therefore, be called a genuine necrosis from concussion."

Widermeister, of Osnabrück, met with the same phenomenon in the brain of a woman who had hemiplegia, from embolus of the left

arteria fossæ Sylvii, forty days before her death. In the tract supplied by this artery, there was found a "necrotic" softened spot, as large as an almond, full of a colloid mass in a tissue perforated like a sieve. Here were found a multitude of corpp. amylacea and colloidea, fat granule cells, broken-down nerve-tubes, a small bony plate, and the calcified ganglion-cells. The latter are distinguishable from those of the cord, depicted by Förster, by their slenderer, better-defined, triangular figure, and by the fact that the calcified nucleus is distinctly visible.

Prof. Heschl relates a case where multipolar calcified cells were found in great abundance in the cortical substance in the neighborhood and wall of a sub-meningeal apoplectic cyst. A scar on the scalp, near the cyst, pointed to the probably traumatic origin of the latter. In another case, two obsolescent tubercles were found in the pons varolii, of the size of hempseed, and hard, with gray walls and yellowish centres, in the neighborhood of which both nerve-fibres and cells were calcified.

4.—"*Asymbolia*," a more Correct Name for Aphasia. FINKELNEUBER (Proceedings of the Niederrheinische Gesellschaft in Bonn. Berlin Klin. Wochenschrift, 38, 1870.)

The author insists that the loss of function in this complaint is not adequately expressed by the words "aphasia" and "agraphia." The loss extends to all those cerebral processes which are concerned in transmitting ideas by the medium of *signs* of any sort. And it must include an impairment of the power of understanding symbols, as well as of the power of using them.

"The important and independent part which the *symbolic faculty* plays, in enlarging our capacity for reproducing and combining ideas has long been acknowledged by the schools of philosophy. Kant designates it as the '*facultas signatrix*,' and names its function 'symbolical cognition (Erkenntniss).' This symbolical cognition is not confined to spoken or written words. Besides word-symbols, there exist a multitude of signs which play the part of symbols; in music, in many sciences, especially algebra, geometry, and chemistry, in religious ceremonies, in all the relations of civil and social life, we encounter a host of conventional signs for ideas. . . . The statement, so frequently made, and of late repeated by Max Müller, that the thought of a conception is the same as the thought of the word representing it, and that man can only think by the aid of mental speech, is erroneous on a scientific point of view. Not to consider the well-established instances of persons born deaf, mute, and blind, who have given firm proofs of thought, or the exact descriptions given by persons of intelligence, who have suffered from aphasia (Lordat), empirical psychology finds in healthy mental action many arguments against the identity of the act of thought with the act of word-perception." We often, for instance, read a printed page aloud without taking in its meaning.

"*Asymbolia*," or the disturbance of the symbolic faculty, is a morbid condition in which the power of understanding ideas through signs previously learned, as well as of imparting ideas in the same way,

is partially or completely lost. A deaf-mute, or even an animal, entirely destitute of the faculty of speech, can therefore suffer from asymbolia.

5.—*Aphasia allied to Chorea.* ARNDT. (Proceedings of the Med. Verein zu Greifswald: Berliner Klin. Wochenschrift, 42, 1870.)

The patient who served as the text of Arndt's remarks was a man of twenty-nine, who had suffered from symptoms of tabes for about two and a half years preceding his death; and, about one year and a quarter after the commencement of this disease, had also had an attack resembling apoplexy. Subsequent to the latter, slight paresis of the right arm and right side of the face appeared, together with an entire loss of the power to select the right words to convey his thoughts. His strenuous exertions to find suitable expressions brought on a habit of stammering and stuttering, which lasted after the former difficulty had nearly disappeared. At the autopsy the brain was found very moist and soft; the third frontal convolution, the convolutions of the island, and the walls of the Sylvian fissure, were healthy. The medulla in the left frontal lobe, corresponding to the tracts which led from the third frontal convolution, was very porous (*état criblé*), and full of aneurismatic vessels, not ruptured, one of them as large as a crowquill. In the region where this alteration had occurred the nerve-tubes were not affected, but a few granule-cells and numerous amyloid corpuscles were found—extensive gray degeneration of lateral and posterior columns of the cord. The author points out that the cortex was found normal, or at most only infiltrated with serum, and the faculty of forming ideas was likewise normal; that the impairment of coördination in the apparatus for speech was attributable to paralysis (from pressure) of some fibres, with excessive irritability of others, and that the stammering, as well as the confusion of words, was to be considered as essentially a disturbance of speech resulting from abnormally associated movements (*Mitbewegungen*), and therefore allied to chorea.

6.—*Paraplegia Dolorosa.* TH. SIMON. (Berliner Klin. Wochenschrift, 35 and 36, 1870.)

The designation "*paraplégie douloureuse*" was employed by Cruveilhier. Charcot has observed six cases of this disease, all of which were developed in the course of mammary cancer.

The series of breast-cancers that furnish these six cases numbered thirty-eight. In three autopsies he demonstrated carcinoma of a lumbar vertebra, which he asserts to be the source of the compression and irritation characteristic of this disease. He says that "the skin, especially during the paroxysms of pain, is often very sensitive to the touch. At the same time, walking becomes troublesome, and, later, the patient cannot walk without help; finally, muscular atrophy ensues, and the patient loses the power to stand."

The present article contains a description of a case observed by Simon, as follows: A woman, aged forty-eight, had cancer of the breast. About eight months after it was first noticed, she felt a violent pain in both hypochondria, running out toward the spine. In a month

or two the pains became excessive, "as if all her bones were a-breaking in pieces;" she had good nights, taking an evening dose of ʒi drachm of chloral; and after about sixteen weeks the pains had ceased to be severe. When the diminution in pain permitted her to try walk, it was perceived that she could walk but a few steps at a time shuffling with her feet, and straddling, and then had to grasp the bed to support herself. As soon as she closed her eyes she began to tremor. In bed, her absolute muscular force was very slight. Cutaneous sensibility was absent from all parts below the lower border of the ribs. At a later period, retention of urine and involuntary discharges from the bowels occurred. The intellect and speech remained good. The urine, at a late stage, varied excessively in quantity, sometimes measuring only a litre, once even 5,050 cubic centimetres (about 160 oz.) *per diem*, the specific gravity being from 1008 to 1014 and no sugar or albumen being present. At the time of death there were many bed-sores over the buttocks and legs. The total duration of the sickness was fifteen months.

At the autopsy the spine of the first lumbar vertebra was found to be included in a new formation, which projected into the canal and pressed upon the dura mater. The spot compressed was situated eight centimetres above the filum terminale, and was less than one centimetre in length. The bands of Gell, in the neck, and the entire posterior columns in the thoracic region, were pure white, while the anterior and lateral columns were of a dull-gray color. Eight centimetres below the medulla oblongata there was a softened spot, over one centimetre in length, situated mainly in the left anterior cornu, and partly in the left lateral column. The cancer of the vertebra was alveolar, that of the breast was scirrhus, and there was medullary cancer in the liver and supra-renal bodies. After the cord had lain in the solution of bichromate of potassa for some days, it was seen that the anterior and lateral columns were healthy, while the "dazzling-white" posterior columns were full of granule-cells, thus quite reversing the opinion derived from simple gross inspection. In the lower part of the cord the entire posterior columns were affected, but became freer in the ascending direction; and in the pedunculi cerebri no granule-cells were found. There was a great destruction of nerve-tubes in the diseased portions, and between the nerve-tubes were seen great tracts of a fibrous mass, containing relatively few nuclei. The continuity of the posterior columns was not at all interrupted by the tumor; and yet while the anterior and lateral were free from disease, the posterior had undergone complete degeneration, which extended, in a diminished degree, even to the floor of the fourth ventricle.

E. Leyden has described eight cases, of which four occurred between the ages of forty and fifty. Taking in a case described by Black (*Medical Times and Gazette*), the duration of the disease was in four cases one, five, five and a quarter, and six months, respectively in five others, from ten to eighteen months. Five, and probably six were cases of primary carcinoma of the vertebrae; and neither of the others was secondary to mammary cancer.

There is in general a great similarity in the symptoms of the severe

case. Weakness of the lower extremities almost always appears several months after the pains begin to be felt, and in a few days it becomes complete paraplegia. In two cases it came on very suddenly. Charcot's statement, that "paralysis of the sphincters, alteration of the urine, especial tendency to bed-sores, have not as yet been observed," is superseded by the facts of Simon's case, as well as several of Leyden's. The preference of the disease for the lumbar vertebræ is remarkable; they are attacked in eight of the sixteen cases here mentioned. It is difficult to explain the diabetes insipidus which was so marked a feature of Simon's case.

In employing the term "paraplegia dolorosa" to designate a certain group of symptoms, it is well to remember that this group may make its appearance in the absence of vertebral cancer; and that, conversely, cancer of the vertebræ may exist without giving rise to these symptoms.

7.—*A Peculiar Form of Secondary Degeneration of the Cord.* C. WESTPHAL. (Archiv für Psychiatrie und Nervenkrankheiten, ii., 2.)

This form has never been described; it was found by the author in two cases, of which the history is as follows:

CASE I.—Lange, aged 58. A small tumor (sarcoma) appeared in the muscles of the left thigh, a year and a half before his admission to hospital. Severe pain in breast and small of the back for seven weeks preceding admission. There was, however, no impairment of sensibility or motility, as far as he knew, until that day, when he felt weak on rising in the morning; presently there came on a numbness and impotence in the lower limbs, commencing at the feet, which increased so rapidly that he had to be taken to the Charité on the same day.

At entrance there was no abnormal phenomenon in respect to the cerebral functions, or the innervation of the face and arms. Motility of lower extremities absolutely gone; a sense of numbness, reaching to the navel; no fornication; a sense of constriction, as by a girdle, at the highest point to which the sense of numbness reached. The line of separation of normal from impaired sensibility lay above the navel, forming a double curve (UU) on the right and left sides of the abdomen; below this the sense of temperature, of pain, and of touch, the muscular sense, and reflex excitability, were extinguished, though not abruptly.

Slight curvature backward and to the right, between the fifth and the eighth dorsal vertebræ. Exceeding sensitiveness to pressure at this point.

At the level of the line above described there were violent pains, at first transient, afterward permanent, which ran through the breast in the direction of the vertebral column. After eating or drinking there was a sense of pressure and constriction in the belly. Urine usually passed involuntarily, stool always. The epidermis began to be shed in abundant scales. Oedema of legs; bed-sores; death in two months.

At the autopsy there was found a very large sarcoma of the left thigh, disconnected with the bone and periosteum. A soft tumor had

grown from the body of the eighth dorsal vertebra, destroying the arch and spinous process, and encircling the cord, excepting a small portion on the right side, with nearly a complete ring of new formation. The cord was compressed for an extent of one inch and three quarters; at its slenderest part, its diameter was scarcely one millimetre.

The cord was soaked in a solution of bichromate of potassa, with the result of demonstrating the fallacy of trusting to microscopic appearances; for those parts which, at the autopsy, had been considered the seat of degeneration from their apparently gray color, were now demonstrated to be normal, and *vice versa*, the apparently healthy portions were stained bright yellow, proving their morbid condition. The portion where the compression was greatest was too soft for microscopic examination. There was a sharply-defined affection of the posterior columns in the upper part of the cord; a less marked affection of the parts below the constriction. The lateral columns had suffered, both below and in the neighborhood of the compressed portion; the anterior columns only were compressed. But the characteristic and altogether peculiar phenomenon was the appearance of "*circular and oval figures* reminding one of drawings of the extinct craters in the moon." These are bright yellow, may be seen in sections for some inches above and below the compressed spot, and must be interpreted as evidence that the degeneration has extended up and downward in a *quasi* cylindrical form, though the cylinder seems of a different shape in each section, never quite round, frequently splitting up into two or three independent or partially-fused figures, and once presenting two concentric rings.

CASE II.—A boy of twelve years. Fracture of the body of the fifth or sixth dorsal vertebra, and displacement of the fragments so as nearly to sever the cord. The same figures were visible in sections of the cord made after soaking in bichromate of potassa; above the point of compression they lay in the right half of the cord; below it, in the left. In the previous case, the ovals lay mainly to the left, both above and below; the pressure of the tumor, too, was mainly exerted upon the left side.

The presence of an abundance of granule-cells was demonstrated in the ring-shaped figures, and in general in the portions colored yellow by the chemical solution. The parts not colored were free.

(The reader's attention is called to the article on Paraplegia Dolerosissima, in the Chronicle for this month. The similarity of the symptoms is striking; the fact that both Simon and Westphal were deceived by the gross appearances of the fresh specimens is also worth noting, but Simon expressly states that ring-shaped figures like those of Westphal were *not* visible in the case reported by him.)

8.—*Pulsation of the Vena Centralis Retinae in Epilepsy and Allied Conditions.* Prof. KÖSTL, and Docent Dr. NIEMETSCHKE, of Prague. (Prager Vierteljahrschrift, 106 and 107 Bd., 1870.)

The conclusions here given are based on ophthalmoscopic exami-

nations of the eyes of about 250 insane patients, in only 36 of whom the venous pulsation was observed.

Every case of epilepsy examined presented this phenomenon.

The 36 cases are divided into three classes: (a) Fully-developed epilepsy, 12 cases. (b) Cases presenting the symptom of *temporary loss of sight or consciousness*, as well as headache, which, when it grew worse, was accompanied by excitement and delusions of the senses. These numbered 17. (c) Seven cases in which this class of symptoms could not be demonstrated to exist; all incurables.

The following are the general conclusions:

1. The venous pulse is produced when the eye is made anæmic by extra, or intra-ocular pressure. It may be observed in a normal eye when gentle continuous pressure is made upon the eyeball.

2. Anæmia of the eye—chiefly manifested by pallor of the optic papilla—must be the result of general anæmia or of inadequate fulness of the internal carotid; in these cases, *the venous pulse also exists. Hence the occurrence of the latter phenomenon in epilepsy and allied conditions, of which cerebral anæmia is the cause.*

3. When the access of blood to any organ is hindered or prevented, the metamorphosis of tissue is impeded, and, in consequence, the function of the part is more or less suspended. In slighter degrees of cerebral anæmia the patients suffer from temporary loss of sight, giddiness, and loss of consciousness. The greater the degree of anæmia, the more decided is the syncope of the affected organs. In the eye, sight is lost; in the ear, hearing; in the brain, perception, will, and thought. If this state lasts, the man dies. Only a speedy restoration of the impeded circulation can revive the depressed functions.

4. In anæmic persons, redness of the papilla, distention of the retinal veins, and swelling of the retinal tissue, are sometimes found. This state can only be interpreted as the secondary vascular turgescence following anæmia. During the slighter degrees of reactive hyperæmia there are pains, spasms, increased irritability, excitement. In the higher degrees, we observe general convulsions, hallucinations, exaltation, and mania.

Ectasia of the central veins, great fulness of the capillaries of the optic nerve, and glistening turgescence of the retinal tissue, characterize (as above indicated) the state of reactive hyperæmia. Of the ten patients in whom this was observed, all were in a state of excitement; four of them being decided epileptics. Nine of the ten were either cured or improved. On the other hand, in old, *incurable* cases of epilepsy, there was uniformly found a dilatation of the trunks of the central artery, with contraction of the central vein, and absence of the glistening reflecting surface that was to be seen in the cases of reactive hyperæmia. A long-continued state of anæmia, such as would exist in the severer cases of epilepsy, would imply as a result the restriction of the circulation to the larger arteries, and finally dilatation of the latter, with loss of contractile power. Dilated central arteries, therefore, are characteristic of the periods of severe epileptic disease, while dilated veins are a ground for a favorable prognosis.

Among the causes of cerebral anæmia, the following are enumerated.

ated: general anæmia; dilatation of the superior thyroid artery; contraction of the carotid; stenosis of the aorta; diminished contractility of the heart.

9.—*Infantile Paralysis, and Paralytic Contraction.* RICHARD VOLKMANN. (Sammlung Klinischer Vorträge; vide Jahrbüch f. Kinderheilkunde, N. F. III. 4.)

There is no positive demonstration that the so-called spinal paralysis of infancy is really of spinal origin. Upon the first invasion of this morbid condition appears to be very extended, and the brain and membranes seem to participate in it; but the rapid loss of electric irritability is a strong argument for its spinal origin.

Characteristic symptoms are: rapid disappearance of all irritative phenomena; partial recovery from the original paralysis; absence of all impairment of sensibility in the bladder and rectum, and in the sexual sphere; speedy impairment of nutrition, and consecutive deformities in the paralyzed limbs.

The form assumed is the monoplegic (one foot, less commonly arm), the paraplegic, or the hemiplegic; rarely paralysis of three, or four extremities. It usually occurs from the seventh month to the end of the second year of life.

The hemiplegic form must not be excluded, since it exhibits characteristic behavior toward the electric stimulus. It is decidedly common, but in many cases leads to the monoplegic form, through recovery of one extremity.

The degree of restoration of function varies. It may be complete (Kennedy's temporary paralysis), or a single muscle, as the tibialis anticus, may alone remain palsied, or all the muscles of one extremity except one, may resume their functions. As a rule, a few weeks after the question as to what is to remain palsied and what to recover and after six months, or a year, we most certainly can expect no important change in the paralysis.

The statement of the two Duchennes, that the palsied muscles very soon undergo fatty degeneration, is incorrect. Volkmann and Staudener have repeatedly cut out portions of totally palsied muscles, and found, at most, the primitive muscular bundles as it were finely granular (fein bestäubt), the nuclei and the interstitial fatty tissue sometimes increased, and the muscular bundles in some places rather smaller than usual; but never a decided fatty metamorphosis.

The prognosis, whether the constant or induced electric current is used, or whether electricity be entirely neglected, is unfavorable. After six or twelve months, we have no reason to hope for further success whatever has ceased to respond to electric stimulus, after a few weeks from the commencement of the disease, will remain paralyzed [?].

The impairment of nutrition, which includes the arrest of growth in the extremities, does not depend exclusively upon the inactivity of the latter. This is shown by those cases of Kennedy's, in which the paralysis entirely disappeared, but the trophic disturbance nevertheless made its appearance. These disturbances of nutrition, in connection with the changes of form and of relative position of the articular surface

and the paralytic contractions, cause the majority of all non-congenital deformities, as pes varus, valgus, calcaneus, and their combinations.

In accordance with the generally received (or "antagonistic") theory, these partial contractions are supposed to originate in traction exercised by the paralyzed¹ muscles; and, when in time these muscles lose the power of extension, the contractions become retractions.

The stimulus which caused the muscles to contract was found in the muscular tonicity; but the latter is proved by experiment to be unable to overcome the weight of a limb, or even of a portion of a limb.

Werner therefore modified this antagonistic theory, and declared that a muscle may contract actively, but cannot extend itself actively; when its antagonist is paralyzed, there remains nothing that can extend it, except the actual weight of the extremity; and, as, in cases of paralysis of the extensors, the limbs often assume and long retain the flexed position, secondary distortion is but a natural result.

But the various deformities, in point of fact, will not fit into this antagonistic scheme. The muscles that are most paralyzed are often the ones that are shortened, and the deflection of the joint is often toward the paralyzed side.

A part of these contractions (as Hüter demonstrated) come to pass in simple accordance with the law of gravitation. Thus, pes equinovarus is developed if the child is very young and has not learned to walk, or leaves off walking for a long time, because the foot, left to the action of its own weight, spontaneously assumes the morbid posture; but, if he is old enough to walk, or to resume walking speedily, the weight of the body pressing on the foot causes a pes valgus, just as in certain occupations which tax the leg-muscles to the point of exhaustion.

In paralytic flat-foot there is but a slight tendency to the formation of contractions, because the weight of the foot when at rest opposes such contraction. The same is true of pes calcaneus, which, however, is accompanied by hollowing of the planta.

Paralytic pes calcaneus, and some other paralytic deformities of joints (hip, knee), arise, according to Volkmann, in the following manner: It is difficult or impossible for the patient to maintain the bones balanced one upon the other by muscular action; therefore he is compelled to let them assume the faulty, bent position, in which the ligaments lend their aid in holding the joint stiff, when the weight of the trunk bears upon it. In case the muscles moving the knee are paralyzed, the position assumed is that in which the posterior ligaments are constantly strained; and the consequence is a genu recurvatum. In the case of a palsied arm, the muscles of the forearm are the ones most affected, and, as the elbow-joint freely assumes the flexed and the extended positions, the utmost deformity is a slight degree of pronation.

The hand experiences the greatest alteration, the fingers and wrist being more or less bent. Volkmann attributes this not to paralysis of

¹ Read "Non paralyzed" ? (den zug der gelähmten muskeln).

the extensors, inasmuch as they are sometimes less palsied than the antagonists, the contracted flexors, but he considers flexion to be the middle position, which leads to contraction when the extensors are not sufficiently exercised.

Children must be induced to walk as soon as possible, must be made to step fairly upon the sole, must not have crutches, must be carefully watched in walking, and false positions promptly corrected by appropriate apparatus.

10.—*Alterations in the Cerebral Lymphatic Vessels.* GOLGE. (Gazz. Med. Ital. Lombardia, 20, 1870. A. M. Centr. Ztg., 45, 1870.)

These vessels consist of canals, bounded exteriorly by a thin membrane of connective tissue, internally by the walls of the blood-vessels, the latter being surrounded by the former vessels.

They differ from the lymphatics of other regions, in that they have no endothelium.

Their calibre is a little greater in children than in adults; it is greatest in the hemispheres, next in the corpus striata, thalami, optic and cerebellum; it stands in the inverse ratio to that of the blood-vessels.

The rapid distention of the cerebral blood-vessels (acute congestion) is always followed by an immediate diminution of the corresponding lymphatic spaces; and the contraction of the former is followed by dilatation of the latter. This phenomenon affords a solution to the much-debated question of the possibility of acute cerebral congestion.

Considerable dilatation of the vessels and of their lymphatic spaces may exist simultaneously, but, as a rule, only in persons who are disposed to venous stasis and serous transudation in consequence of chronic affections of the heart and lungs. In such cases we are obliged to assume a diminution of the cerebral substance, to balance the increase in the volume of the vessels. The author, in fact, has found in senile atrophy a considerable dilatation of the blood-vessels, with excessive distention and sinuosity of the lymphatic spaces.

General or partial cerebral oedema is always associated with a corresponding abnormal dilatation of the lymphatic spaces.

In the pathogenesis of the peculiar condition which Durand-Fardet has designated "*état criblé*," the lymphatic vessels play an important part. The great distention of the latter, which gives the brain a porous aspect, is probably the result of atrophy of the cerebral substance analogous to the contraction of the lung-tissue found in bronchiectasia.

The following are the most important pathologic changes of the walls of these lymphatics: Fatty degeneration, constant in children dying in the first year of life; sometimes found, though less extensively, in adults. Calcareous degeneration is very common, principally in old people, and always accompanied by the same change in the muscular coat of the blood-vessels. Pigmentation, in the form of long and crooked streaks, formed sometimes by heaps of pigment-molecules in the cells from which the wall of the lymph-vessel is developed, sometimes by large granules of hæmatosin, which are also to be found

in the connective-tissue cells of the wall. The latter variety is of constant occurrence in adults. Finally, new formations, less common here than in other regions.

In the contents of these vessels we may find an abnormal accumulation of lymphatic corpuscles, or granules of hæmotosin, fatty degeneration of the lymph-corpuscles, or pus, or tubercle, etc.

These canals are capable of transferring neoplasms from one part of the brain to another.

11.—*Galvanization of the Sympathetic.* From a Lecture delivered by MORITZ MEYER before the Berliner Medicinische Gesellschaft. (Allg. Med. Centr. Ztg., 63, 1870.)

In 1868 the author described cases of apoplectic paralysis, vaso-motor spasm, and progressive muscular atrophy, which he had cured by this method. Only a small portion of the therapeutic results can be explained from physiological experiments, since these experiments inform us merely of the influence exercised by the sympathetic over the vaso-motor nerves, the temperature, and the dilatator iridis muscle. In publishing new observations with a view to establishing physiological facts, it is necessary to select those cases only in which (1) a chronic, steadily progressive disease has improved almost instantly under the influence of galvanization of the sympathetic; (2) no other remedy has been employed; and (3) the poles have always been applied in the same places.

In the three following observations, one method has been steadily followed, namely: The zinc-pole of a battery of from twelve to eighteen elements is applied to the spot corresponding to the superior cervical ganglion, below the angle of the jaw, and the copper-pole upon the transverse process of the seventh cervical vertebra of the opposite side. They are held steadily in that position for five or ten minutes, when the following phenomena usually occur: First, a rise of the bodily temperature, perceived by the patient, and measurable by the thermometer; second, a visible transudation of sweat from the ends of the fingers and the pores of the palm of the hand, not always parallel with the rise of temperature; third, simultaneously with the second, relaxation of the spasm, the pain, and the tension, and a feeling of relief in the affected extremity.

CASE I.—*Arthritis Nodosa.*—A lady, aged twenty-four, suffered from a painful swelling in the metacarpal joint of the second and third fingers of the right hand, which gradually increased to the point of preventing the free motion of the fingers. No cause was known. In the winter following, the pains increased, and spread to both arms; while a numbness was frequently felt in the hand, and a chilly sensation all over the body. In January (1868) the pains increased considerably, becoming most intense in the shoulders and arms, so that it was impossible for the patient to move them, and the slightest touch made her cry out. The sweating-cure, and sulphur-baths, diminished the stiffness, but not the pain and swelling. The baths of Teplitz had but a transitory effect. Almost all the joints became more or less swollen, and exceedingly stiff, imparting to the body the feeling of ex-

cessive weight. The mud-baths of Teplitz, upon a second trial, rather increased the pains. The author saw the patient for the first time in November, 1869. She was excessively anæmic; she was affected with arthritis nodosa of both arms and legs, the greater part of the joints in those members being swollen, more or less immovable, and some of them ankylosed; she had excruciating pain, even when lying quiet, especially at night and in damp weather; her appetite and digestion were poor, menses scanty, and pulse small and accelerated.

The poles were applied in the manner already described. (The inverse mode of application always increased the discomfort of the patient.) From the very first session, the pain diminished distinctly. The swelling was soon reduced in amount, the temperature in the arms, and especially in the hands, increased. The sensation of warmth increased for hours, and, when the application was made at noon, it often lasted through the evening. After thirty-three sessions, confined solely to this mode of treatment, the patient was able to walk almost four miles (eine Stunde), inasmuch as the swelling and pain in the legs were entirely gone. Pain in the arms remained in a slight degree, and could be removed at any time in a few minutes by the same treatment. The urine contained large quantities of acid urate of soda; its specific gravity was 1029, its reaction strongly acid. The perspiration had an unusual, penetrating odor. Complexion greatly improved, appetite and digestion perfect. After sixteen more sessions (two or three months in all), the pain had almost disappeared, and the swelling of the joints was so far diminished that the skin lay loose over them, and the hands were capable of all the usual feminine avocations. March 28th, after seventy-five sessions, scarcely a trace of any morbid condition remains.

CASE II.—*Spasm of the Vaso-motor Nerves in consequence of Over-exertion.*—A healthy lady, aged thirty-one, had been making unusual exertions in knitting, when one morning, immediately upon waking, she found her second finger-joint was stiff, causing a difficulty in shutting the hand. This occurred every morning, but always passed off soon. She continued her knitting; the stiffness became greater, more lasting, and painful; she felt pain and weakness in lifting even light objects, and a numbness in the ends of the fingers. Six weeks' rest, and local measures, were unavailing. Relief was experienced from the first application of galvanism to the sympathetic. Twenty-one sessions completed the cure. Patient can perform all her former duties perfectly well, not excepting knitting.

CASE III.—Musician, aged forty-nine, plays the viola, and gives lessons on the piano. Two or three years ago a pain commenced in the upper joint of the little finger of the left hand, which is subject to special exertion in playing the viola. At first very transient, this pain gradually became more frequent and severe, and was but little benefited by rest. It extended sometimes to the elbow; was of a cutting, burning, or pricking character, almost constant, and very severe. Great and almost unbearable heat was also felt in the hand. When first seen, the slightest touch upon the patient's hand, at the inner border, caused the most violent pain. A very weak stream from twelve elements was

employed for five or six minutes; relief was immediately felt, which lasted several hours. After six sessions the pain was entirely gone; the hand could be touched without exciting pain. After twenty-four sessions (thirty-six days), he played the piano an hour and a half without interruption, and felt not the slightest inconvenience from it.

12.—*Chronic Intoxication from Ether.* MARTIN. (Gazette des Hôpitaux, May 10, 1870.)

The patient, a woman of forty-eight years, had been in the habit of swallowing after each meal a lump of sugar, wetted with sulphuric ether, to relieve a difficulty in digestion. During the space of two months and a half, preceding her admission to the hospital *de La Pitié*, she took, in this manner, a total of 180 grammes (nearly six ounces). When she had continued the practice for about seven weeks, trembling of the hands commenced. A week later she began to feel severe pains in the lower front part of the chest, and between the shoulder-blades. She also suffered from vomiting of a whitish watery fluid on rising in the morning. In a week more her gait became unsteady, and she suffered from trembling of the toes, cramps in the calves, and prickling sensations in the feet.

Upon admission to hospital, she presented all the above symptoms. The pain resembled that which would be caused by two blisters, of eight or ten centimetres in diameter, the one placed a little above the epigastrium, the other at the same level on the back. It was intermittent, and was excited by any sort of aliment. There were regular slight twitchings in certain portions of the limbs. The strength of the hands was not diminished. Almost continual buzzing in the ears; muscæ volitantes occasionally, usually followed by a brief attack of frontal headache. Pupils slightly enlarged. Sleep undisturbed. No fever. Soft souffle at base of heart, and in vessels of neck, accompanying the first sound. No other important symptoms.

An emetic at entrance, a daily bath, a little opium at night, and abstinence from ether, constituted the entire treatment. Recovery was complete at the end of two weeks.

13.—*Different Effects of the Continued and the Induced Currents upon Muscular Contractility.* CHERON. (Académie des Sciences, May 30, 1870.)

The author's conclusions are drawn from cases of paralysis of the deltoid, either essential or consecutive to an eruptive fever or a traumatism; from cases of so-called rheumatic facial palsy, and saturnine palsy:

1. In the above classes of paralysis, the continued current causes contraction of the palsied organs at the moments of opening and closing; while induced currents, of whatever intensity, fail to do the same.

2. Such muscles, when cure is effected, are amenable to the action of the will, but not in an appreciable degree to that of the induced current; while the continuous current, at opening and closing, produces contraction in a very characteristic way. Therefore,

3. Induced currents are not the best stimulus for paralyzed mus-

cles. We can no longer hold to the common statement, "Electromuscular irritability is not necessary to motility."

4. *Farado-muscular contractility*, representing the reaction of the muscles, under the influence of the induced current, deserves carefully to be distinguished from *galvano-muscular contractility*, or the reaction under the continued current.

The diagnostic importance of these facts is obvious.

14.—*Statistics of Hydrophobia in France.* (Wochenblatt für Medic. Statistik und Epidemiologie. A. M. Centr. Ztg., 73, 1870.)

Dumas, Minister of Agriculture, established a register of hydrophobia in France twenty years ago; and the following facts, communicated by M. Bouley to the *Académie des Sciences*, are drawn from his register for the period from 1863 to 1868:

In 49 departments 320 persons were bitten by mad animals, while in 32 no one was bitten, and from eight the reports are wanting. Hydrophobia ensued in 129 of these persons, in 123 it did not occur, in 68 the absence of further accounts makes their escape probable. In all these cases, 310 were bitten by dogs, five by cats, and five by wolves. All persons attacked by hydrophobia died. Of the 310 dogs, 180 were male. Two-thirds of the persons bitten were males.

The summer does not favor the outbreak of rabies canina, as is commonly supposed. In the spring months, 89 persons were bitten, in summer 74, in autumn 64, in winter 75.

In 106 cases, the period from the date of inoculation to that of the outbreak of the disease was ascertained, and was found, in 73 instances, not to exceed *two months*. After this date, the frequency of outbreaks rapidly diminished, and during the eighth month but one case occurred; the longest period of incubation having been 240 days. After the *ninetieth day*, complete immunity is most highly probable. The stage of incubation was decidedly shorter, in proportion as the individual bitten was younger. By ranging the cases in two series, one including the ages from three to twenty, the other those above twenty, the mean duration of this stage was found to be forty-four days in the first instance, and seventy-five days in the second. Between the ages of five and fifteen, however, the danger of taking the disease was but half as great as in the case of adults.

Wounds of the face were almost invariably fatal; those of the hands were so in about two-thirds of the cases; those of the arms or legs in less than one-third; and those of the trunk in nearly two-thirds.

There is nothing worth especial mention as a specific remedy. But the surest preventive known is the actual cautery, since 92 out of 134 thus treated escaped, while only 10 of 66 who neglected the precaution were equally fortunate. If the hot iron be not at hand, let the wound be sucked, made to bleed freely, washed freely, and ligated, without delay.

15.—*Cretinism in the Valley of the Danube.* GLATTER. (Verein für Psychiatrie und forensische Psychologie, in Vienna; *vide* Wochenblatt, No. 38, 1870.)

The author is *Physikus* of the Comitats of Weiselburg, Raab, and Pesth, lying on both sides of the stream. Cretinism, goitre, dwarfishness, and deaf-mutism, are more frequent upon the *right bank*, and upon the adjacent side of the island in the river. The cause of this excess cannot be traced to any difference in the altitude, the social relations of the inhabitants, or their nationality. Both banks are composed of alluvium; but with the difference, that that of the right, or western bank, originated in the Alps, where cretinism is common; while that of the left bank is partially derived from the Carpathians. The influence of the soil is further seen in the fact that certain *houses* are notorious for causing goitre in strangers who take up their residence there. The delta-regions of the right bank are most affected, while at a distance from the river ("in the interior") cretinism and its concomitants are not observed.

At Visegrad the Danube makes a great bend, which favors the deposition of much alluvium. In the time of Mathias Corvinus this town suffered from the same want as at the present day, namely, a want of increase of the population.

The water was found excessively hard in places lying at the foot of the mountains, and soft (river water) in the islands.

Hereditary influence is demonstrable, descending chiefly through mothers, who may be themselves healthy, but in whose family some one of this group of diseases exists. It is related that cretinism was very prevalent in Hedervár during the last century. The Empress Maria Theresa, being advised of the fact, quartered a squadron of Bohemian cuirassiers in the place; and at present the number of cretins is no greater than in other places in the neighborhood.

The cretins of the Danube Valley differ from those of the Alps, in being exceedingly sensitive to low temperatures, and sexually torpid.

16.—*Puerperal Insanity.* J. THOMPSON DICKSON, M. R. C. P. (*Journal of Mental Science*, October, 1870.) ROBERT BOYD, F. R. C. P. (*Ibid.*, July, 1870.) F. WEBER, St. Petersburg (*Allg. Med. C. Ztg.*, 87, 88, 1870.)

Dickson believes the common term "puerperal mania" to be inappropriate; since, while mania is often the form assumed by the disease in question, melancholia is almost or quite as frequent, while delusional insanity and acute dementia are as common as any, or perhaps almost always more or less complicate the other forms. The so-called *puerperal* insanity is ordinary insanity, appearing at childbirth, and only slightly modified by that fact.

"In almost all instances, perhaps in all," he remarks, "there is a potentiality of insanity either from hereditary transmission or specially and accidentally induced, but not associated with the parturient condition. It seems highly probable, though the evidence on this point is as yet incomplete, that, without the potentiality above spoken of, a patient will not become insane as a consequence of parturition; and it appears much more correct to speak of the cases as insanity appearing at the puerperal season, than to use the term "puerperal" in an ad-

jectival sense, as though the insanity was a special form peculiar to child-bearing."

He supports his views by relating the history of ten (hospital) cases. In three of these the mother had been insane, in three more the brothers and sisters, and in two there had been previous epilepsy or other abnormal condition of the nervous system.

These conclusions resemble those reached by Boyd, which are based upon the observation of 63 cases, occurring during twenty years in the Somerset County Lunatic Asylum. He uses the following expressions: "Of the *forms* of the disorder on admission, mania was the most frequent, being three to one of the cases of melancholia; but they frequently alternated after the maniacal paroxysms; great depression and melancholy succeeded, and continued for some time. Seven of the 63 were cases of dementia." And more specifically, of 22 cases which became evident at, or soon after childbirth, "fourteen were reported as dangerous to others, violent, in a state of mania," while eight were incoherent, in a state of dementia, when admitted but, of 34 cases which came on later, the form of insanity in the greater number was melancholia, with paroxysms of mania.

Hereditary predisposition existed in 13 cases; viz, four times on the father's side, five times on the mother's, and four other instances where it is not stated on which side it existed. The bodily health good in eight only.

These 63 cases constituted 4.6 per cent. of females admitted during the period mentioned, not including readmissions.

Of the whole number only five were unmarried. Of 415 at all well, 263 were unmarried, 122 married, and 30 widows. But, in countries, the number of unmarried insane women, of all classes, considerably exceeds that of the married.

Forty-five cases recovered, and 7 died.

Weber reports upon 46 cases, occurring in the Obuchow Hospital during the ten years ending with 1865. Eleven of the women were unmarried. The brevity of the attacks is quite remarkable, the entire course of the disease occupying less than thirty days in 33 of the cases. The women belonged to the most ignorant classes, and often were unable even to state how many children their mothers had borne; hence it was impossible to trace an hereditary taint in any instance. Anæmia and general ill-health were certainly predisposing causes for only three of the women had good constitutions. The disease occurred twenty-three times among 8,036 women delivered in the St. Petersburg hospitals, according to Dr. Hagenburger's report; that is four times as frequently as in Prague and Würzburg among the corresponding class of women. Of the eight deaths, only one was directly caused by the disease in question; in the seven remaining cases other severe and dangerous maladies were present. Twenty-three recovered.

As to the form, only four could be entitled cases of melancholia in one other case there was dementia, which followed an attack of cerebral meningitis. All the other cases exhibited a more or less mani-

acal character, expressed in various ways. In most, the disease made its appearance shortly after the exciting cause, in the form of furious delirium, which at intervals gave place to relaxation and an apathy resembling sopor. Three classes of maniacal disease may be distinguished: 1. Mania with cheerful spirits (*M. propria*); 2. Mania with continual anxiety and restlessness (*Melancholia activa*); 3. Mania with irrational rage (*Vesania*).

17.—*Fractured Bones in the Insane.* W. LANDER LINDSAY, M. D., F. R. S. E. (Edinburgh Medical Journal, November, 1870.) Dr. ROGERS, Superintendent of the Rainhill Asylum. (Journal of Mental Science, October, 1870.) Dr. W. H. O. SANKEY. (Medical Times and Gazette, No. 1025.)

The past year has seen the English public much excited over cases of alleged brutality practised by assistants in insane asylums. The charge is brought in a very sensational manner by a distinguished novelist, that these assistants have a secret knack of breaking the ribs of their patients without causing any external bruises; it is said to be done by means of the knecs. Without further specifying these allegations, we will lay before our readers certain well-established facts bearing on the question.

1. Mollities ossium may affect the whole bony skeleton, and yet be entirely unsuspected during life. In fact, it may be impossible to detect it, save by a *post-mortem* examination. Such cases furnish one of the many arguments in favor of the rule of examining every case of death from insanity. It is doubtful, however, whether this disease is common enough to account for the actual cases of fractured bones in the insane.

2. Fractures of the ribs, in the insane, may easily escape detection during life. "None but those habitually engaged in the management of lunatics," says Lindsay, "can be aware of the extent to which accidental or self-inflicted injuries occur, or of the exceptional character of these injuries. They are exceptional in so far as it is (1) frequently difficult to understand how they *could* have been inflicted (I refer to cases in which ill-usage by attendants has been impossible); and (2) in so far as serious lesions may be developed without the usual accompanying or proportionate physical indications or vital symptoms of any kind. Thus, I have known almost all the ribs of a young man's side broken without a single *outward* indication, or the exhibition of any kind of symptom. No complaint ever emanated from the patient; there was no bruise-mark, no lung-symptom, no indication of the slightest suffering from first to last. Nor was it ever discovered how the injury was inflicted. . . . The patient never could comprehend why he was confined to bed and swathed in flannel!" Dr. Workman, of Toronto, reports two cases of violent mania with fracture of five and seven ribs respectively; the fractures must have existed prior to admission, and in neither would they have been known without *post-mortem* examination.

3. Unsuspected fractures are often found in patients at their admission to the asylum. They are not confined to the ribs; although

they may endanger life, they occasion no apparent discomfort, and they are attributable—at least in very many cases—not to mal-usage by attendants, but to accident or self-inflicted injury. (See Dr. Gray Report of the N. Y. State Asylum for 1862.)

4. The true solution of the mystery of the origin of such accidents is indicated, though in somewhat different terms, by both Sankey and Rogers. The latter says:

"The class of patients to whom these injuries are generally found to occur are the subjects of general paralysis" (paresis), "in whom very exalted notions of their own power and ability, and a strong propensity to order and direct every one else, are combined with great muscular weakness, diminished sensibility to pain, and inability to protect themselves. Their inflated ideas of self-importance lead them into quarrels with other patients, their muscular weakness places them at a disadvantage, and their diminished sensibility hinders them from making known any injuries they may have received, while their general mental confusion renders their narration of events often extremely untrustworthy. A case in point occurs to my recollection as I write. A man, a bricklayer by trade, was observed to be rather poorly, and on my examining him, I found that he had sustained a fracture of one or more ribs. Having removed him to the infirmary, I asked him how it had occurred; he, without hesitation, replied that the attendant of his ward had knocked him down and kicked him; shortly afterwards he told the chief attendant a different version, and eventually he gave me a detailed account of the manner in which the injury had been inflicted by another patient. . . . On my inquiring of this patient he corroborated the other's account in a characteristic manner, saying, 'He wanted to come up into my ward to build a chimney six m—high, and I pushed him down-stairs.'"

Sankey describes this class of patients as follows:

"1. Parietic patients in a certain stage of their malady are known to be furiously excited. They throw themselves about with reckless violence. They frequently attack the bystanders, and they thus often become engaged in scuffles. They are consequently exposed to a kinds of blows and falls of a purely accidental character.

"2. The state of their nervous system is such that the ordinary excited acts" (in self-defence) "are not performed at all, or are not so rapidly executed as to ward off or modify these direct injuries.

"3. There is in them such a dulness of sensibility, or common sensation, that they do not feel the same amount of inconvenience or pain from injuries, so that the effects are masked, and there is nothing to indicate what has taken place, or to note the exact period when the injury occurred.

"In general paresis.

"The outbreak is more sudden than in insanity proper.

"It follows very frequently upon some great mental emotion.

"It is very rarely indeed preceded by (a short stage of) melancholic symptoms.

"The delirium is of a peculiar character (*manie des grandeurs*)."

M. Jules Fabret remarks that patients may pass in a few hours from this condition into that of extreme maniacal excitement.

"It is in this stage, and on account of it most frequently, that the patient is brought to the asylum."

An editorial, in the *Medical Times and Gazette*, very sensibly points out the fact that "non-restraint," in the literal acceptance of the term, is an impossibility. "It is useless to talk of such men" (i. e., certain insane patients, who are quite ready to kill an attendant upon opportunity) "as amenable to reason; they are amenable only to brute force, active or passive, and over some of them even drugs would seem to lose control. They may be held on the floor or on their beds, so as to be incapable of striking, or kicking, and even then they will bite, as many a physician and attendant know to their cost. Such men must be hindered from injuring themselves and others; the question is, How? Force of some kind must be used, active or passive. With six or eight attendants holding a man, and this number is sometimes necessary, it is impossible that he should escape bruising, even should he suffer no more serious injury. In such a case, the *argumentum ad hominem*, usually most unfair, becomes good logic, whether should we prefer to be so held by six or eight men, with their localized grips, or by a stout sheet of canvas uniformly resistant? For our own part, we should, being sane, choose the latter."

18.—*Report of the Insane Asylum at Bendorf, with its Colonies, for 1867-1869.* ERLÉNMEYER. (Berliner Klin. Wochenschrift, No. 37, 1870.)

The author has treated 187 patients in his asylum within the last three years, of whom 60 were treated in the "colonies." Bendorf, the site of the parent institution, is a few miles below Coblenz; the two colonies are not far distant, and command extensive views of the river and its neighborhood. One was originally a villa, and will contain 8 or 10 patients; it is assigned to those of the upper rank, while the middle and lower classes are assigned to the larger colony, which will accommodate 40 or 50. There is a certain family life in these institutions, the tone of which is emphatically elevated by the presence of the relatives of a few of the patients. Thus, of the 38 patients in the smaller colony, four men were allowed the company of their (well) wives; a father stayed with his sick son, a son with his sick father, etc. In the larger colony, this experiment has not yet been made, simply on account of the expense. The well, equally with the insane inmates, were obliged to conform to the rules of the house; and the director reserved the right to send them away at his own discretion. Upon this important point the author says:

"While strongly in favor, above all things, of the entire separation of the patient from all his previous ties and relationships, and though regarding this as the first and most important condition of successful treatment, still, I would only apply this principle to cases of *fully-developed* mental disease, and in certain cases of incipient disorder. I am as strongly in favor of not tearing the patient at once from all his relationships, but of allowing him intercourse with one or more suitable

persons of his own family." "The success of the plan was decided; for these relations not only controlled and watched their friends better than any hired assistants could have done they extended their influence over the other patients, giving counsel and comfort, and furnishing involuntarily the points of socialization in social intercourse." The separation of patients according to their social standing was considered necessary, in order to avoid "all sorts of ill feeling and inconvenience."

The author hopes soon to bring one-half of his patients under "free treatment." The buildings cost but half the sum required for a colossal "closed" asylums, and the care and sustenance of the patients in a manner far more agreeable to themselves—cost also considerably less, as the patients are able to earn part of their own support.

(A work of great value, in connection with the colony-system, is the author's "Die freie Behandlung der Gemüthskranken unter der Leitung der Colonien; 1869.")

19.—*Normal and Pathological Temperature of the Interior of the Cranium.* Dr. E. WENDEL. (Virchow's Archiv, 50, 1.)

The normal temperature of the external auditory meatus is 0.2° C. lower than that of the axilla; the difference, however, varies between 0.1° and 0.3° . In a child, twelve hours before its death from meningeal tuberculosis, the thermometer in the axilla marked 39.8° , in the right ear 38.8° , and in the left ear 39.5° . Four days later, the corresponding temperatures were 38.7° , 38.0° , 38.0° . In another case, the difference between the axilla and the meatus was carefully ascertained to be 0.2° during the first stage; during the second stage, accompanied by general clonic spasms, it amounted to 0.8° , with very slight variations. In diseases where the symptoms were mainly psychical, the difference was not very striking. The venous and arterial connection between the meatus and the interior of the cranium entitles us to assume that the temperature of the meatus will serve as a fair index to that of the latter.

The effects of chloroform, chloral, morphine, and alcohol, were observed in experiments, made upon nearly fifty animals. One ether was held in the rectum; and, the skull being then trepanned and the dura mater separated from the skull, the bulb of a sac was introduced within the cranium. No inflammation occurred, and the temperature remained normal.

In rabbits, the brain was found to be from 0.7° to 1.0° cooler than the rectum; in dogs, from 0.4° to 0.7° . During repose, the temperature sank equally in the brain and rectum. After a sufficient time, chloroform was administered to the extent of producing complete anesthesia, and the following facts were noted:

1. Chloroform lowers the bodily temperature.
2. At the commencement of inhalation the temperature immediately fell, owing, in the author's opinion, to the restless movements of the animals.
3. *The temperature within the skull is diminished more than that within the rectum.* In five experiments the difference between the temperature within the skull, originally 0.5° lower than that in the rectum, and the temperature in the rectum, was 0.5° to 0.7° .

on an average to a point 1.6° lower. After a number of hours, the relative temperature becomes what it was before the experiment. If death occurs during inhalation, the difference is greatest at the time of death.

4. When anæsthesia was not effected, the temperature did not fall.

In a second series of experiments, chloral was administered subcutaneously. The effect upon the general temperature was by no means demonstrable in the same way as in the case of chloroform. The *difference*, however, between the cranium and rectum, was increased as in the previous experiments; that is, it increased from 0.3° to 0.8° , from 0.15° to 0.7° , and from 0.5° to 0.8° . In less than an hour, this difference had returned nearly to the point where it was before the administration of chloral.

Morphine, in subcutaneous doses of .04 ($=0.6$ grain) lowered the general temperature. In five experiments, the temperature of the interior of the cranium sank more rapidly than that of the rectum; but, when the soporific effect passed off, the relative temperature was the same as before the drug was given. The average difference was 0.5° ; but, while the drug was in activity, it rose to 1.1° .

The author ascribes these effects to an irritated state of the vaso-motors of the brain, or to the diminished functional activity of the latter under the influence of the drugs. Either cause may produce a diminution of the metamorphosis of tissue.

The inference is drawn, that these drugs may rationally be given in inflammatory affections of the brain; as has been opium, of late, in meningitis.

Experiments with alcohol, conducted in the same manner as those previously described, show—

That, in alcoholic poisoning, the temperature of the interior of the skull rises, relatively to that of the rest of the body. This goes so far, that the temperature of the former often exceeds that of the rectum.

This fact is explained by supposing a paralysis of the vaso-motors, accompanied by an increase of the capillary circulation and of metamorphosis of tissue within the brain.

20.—*Bromoform, Bromal, and Iodal, as Anæsthetics.* I. RABUTEAU. (Gazette Hebdomadaire.) II. E. STEINAUER. (Physiologischer Verein zu Berlin, March 12, 1870. Berliner Klin. Wochenschrift.)

I. The experiments of Rabuteau appear to show that the former of these agents possesses physiological properties analogous to those of chloroform, while the other two resemble chloral in their effects. At present, however, the subject has been only partially investigated.

Bromoform (a substance little known to chemists) was prepared by Rabuteau from bromal, by adding potassa. The reaction is like that of chloral, namely—



The resulting fluid distilled over at 60° or 65° , and exhibited properties, both chemical and organoleptic, entirely analogous to those of chloroform, so that it could be practically exchanged for the latter. One

differential characteristic is its behavior with iodine; chloroform giving a solution of a bluish-violet color, and bromoform one of a splendid carmine-red. A rat, placed under a bell-glass, with a sponge wet with five or six drops of bromoform, fell asleep in one minute, and was completely anaesthetized. The anaesthesia in this case lasted two or three minutes, but might have been prolonged for any desired length of time by continuing the administration of the vapor. The animals afterward recover completely. Bromoform was given to a dog by inhalation, but the author had only enough of the drug to produce anaesthesia and not sleep. The paws and tail were pinched and pricked without evoking the slightest sign of sensibility. The pupils were enormously dilated. It is suggested that the power of inducing anaesthesia by means of small doses, without the profound and dangerous sleep which chloroform causes, may give the new drug a decided advantage over chloroform.

Bromal has the same formula as chloral, with the substitution of bromine for chlorine; C_2HBrO_2 . The author obtained it in the form of a crystalline hydrate, $C_2HBrO_2 + H_2O$. Its odor reminds one of chloral, and it causes lachrymation and a nasal flux in those who handle it. Its physiological effects, as far as ascertained, seem to resemble those of chloral.

Iodal boils at 25° ; hence it is very difficult to manage. It is usually prepared by treating iodine with a mixture of alcohol and nitric acid. When treated with bases, it decomposes into iodoform and a formiate. It provokes free lachrymation. Five or six grammes were injected into the rectum of a dog, producing anaesthesia, and afterward convulsions and death. The blood was black, the muscles unusually red; the mesentery, brain, and cord, were congested. The breath of this animal smelt very strongly of iodal, which proves that at least a part left the system without undergoing decomposition.

II. Steinauer demonstrated the presence of bromoform in the blood of animals that had taken bromal. His procedure was the same by which Personne demonstrated the existence of chloroform, after the administration of chloral. The blood was evaporated at a heat of $42-45^\circ C.$; and the vapor, being passed through a red-hot porcelain tube, was decomposed, producing hydrobromic acid, which gave a characteristic reaction with a solution of nitrate of silver. The bromide-of-silver reaction did not occur when the diluted vapor of hydrate of bromal alone was used. This demonstration would lead us to expect a physiological action (gradual narcosis) analogous to that of hydrate of chloral, unless the presence of bromine produced some modification.

Dogs, rabbits, and guinea-pigs, upon whom the author practised the subcutaneous injection of from 1.0 to 0.12 grammes of hydrate of bromal, exhibited restlessness and contraction of the pupils almost immediately after the injection; in a few minutes after, hyperaemia of the mucous membrane of the mouth and nose, slight indications of hypnosis, and anaesthesia; then accelerated respiration, dyspnoea, cyanosis; and the animals died, either in convulsions, or with a gradual diminution of the frequency of the pulse and respiration. Reflex activity remained undiminished during the whole time. Smaller doses pro-

duced the same symptoms in a less degree, without causing death. Cold-blooded animals exhibited analogous symptoms after doses of from 0.03 to 0.0016; namely, slight hypnosis, complete anæsthesia, sometimes opisthotonus and death; the latter being preceded for a considerable time by a marked diminution in the frequency of respiration. Given internally, it acted almost as rapidly as by injection.

In both warm-blooded and cold-blooded animals, the autopsy showed in some cases paralysis of the heart, in others tetanus of the (in the warm-blooded, left) ventricle. In frogs, after the heart had been exposed and a subcutaneous dose of from 0.03 to 0.01 administered, the respiration rose for a short time, and then fell simultaneously with the frequency of the pulse; the ventricle contracted unequally, the heart came to a stand-still in the condition of diastole. When the doses measured from 0.0033 to 0.0016, the pulse and respiration first diminished in frequency, then rose above the normal rate and continued thus for hours, finally yielding to a gradual exhaustion. The ventricle ceased in a contraction, while the auricle was still contracting; the ventricle was contracted and empty, while the auricle was full to distention. The author, therefore, distinguishes two forms of poisoning, an acute and a chronic; the former caused by the presence of large amounts of bromoform, the latter by that of bromine or hydrobromic acid in a nascent state, which is furnished in amounts not inconsiderable by the bromoform, a substance easily decomposed.

The author has demonstrated (in the human subject) a diminution of alkali in the blood after the administration of hydrate of chloral [I should read *bromal*], due to the chemical decomposition of bromal on the one hand, and to the reaction of the hydrobromic acid on the other. (Liebreich subsequently remarked that alkali is withdrawn from the blood, not only to perfect the reaction whereby bromal changes to bromoform and a formate, but also in the subsequent decomposition of the bromoform with formation of bromides. Bromoform is not so stable a compound as chloroform; its three atoms of bromine have so slight an affinity for C. that its decomposition, with the formation of bromides, may easily be believed to take place in the organism.) The quantity thus withdrawn might be considerable.

The injection of solutions of carbonate of soda into the stomach prevented the occurrence of death after the subcutaneous administration of bromal; or, when death occurred, it was delayed, and the autopsy showed the signs of the chronic form of poisoning. The author considers a moderate dose of carbonate of potassa an antidote to the bromine-poisoning resulting from the use of hydrate of bromal.

In epilepsy and tabes dorsalis he has given doses as large as one gramme. The result is not stated.

21.—*A Case of Right Hemiplegia with Aphasia, probably of Syphilitic Origin; Good Results from Treatment; Curious Coincidence of Traumatic Palsy of the Left Side of the Face.* Under the care of Dr. BUZZARD, National Hospital for Paralysis and Epilepsy.

At a visit to this hospital last week we saw the patient whose case

is here related. He considered himself to be quite recovered, and he resumed his work; but he still presented some slight evidences of his attack. We gathered the following history of his case:

A male, aged twenty-nine, single, applied at the hospital on August 17, 1870, in the following condition: He walks very lame, drags the right foot, and he can scarcely lift the right hand. There is no loss of sensation in the limbs. With Duchenne's dynamometer the result with the right hand is 0, and with the left 25°. His manner is very odd, the face having a dazed look, and he displays great irritability toward his companion, a young woman to whom he is engaged. His speech is labored, and he is often at a difficulty for the right expression. While the *right* limbs are paralyzed, the *left* side of the face is chiefly, but not solely, affected. On being told to shut his eyes, the left upper eyelid fails to cover the globe by one-eighth. In laughing, the right angle of the mouth is drawn a little higher than the left. In whistling, the mouth is pushed over to the left. The tongue is protruded straight. He cannot eject saliva to any distance. There is an apparent loss of sensation on either side of the face.

On examination a scar is found half an inch in front of, and extending for an inch below, the external auditory meatus of the left ear, and a line of cicatrices runs down the front of the left sterno-mastoid muscle. He says that he had abscesses on this side of the face and neck two years ago; that one in the situation first mentioned was lanced, and that "the water used to run from the scar for two months." At this time he first noticed that he could not close his left eye, and the inability has continued ever since.

He contracted syphilis two years and a half ago, followed by a sore-throat. His present attack (which had occurred three weeks previously) was preceded for a fortnight by great pain in the back of the head and over the left eye; and then one night, while in bed, he suddenly lost his speech, and the power of moving the right arm and leg, but he did not become unconscious. The speech was absolutely lost for three or four days, and then it gradually returned, but remained imperfect at the time of his application. He was in the habit, it seemed, of using words erroneously—as, e. g., calling his watch "hat."

He was admitted into the hospital, and ordered five grains of iodide of potassium three times a day. This dose was increased to ten grains after twelve days, then to fifteen grains after another week, and twenty grains after another fortnight. During the first few days of his stay in hospital his manner was very flighty, and at times he was comatose for hours together; but these symptoms soon subsided, and he gradually improved also in the condition of his limbs.

He left the hospital on October 15th, but continued taking twenty grains of the iodide of potassium three times a day.

When we saw him on November 16th, he could use his arm freely and the grasp of his right hand measured 30° on the dynamometer, against 0 at his first examination—an average healthy grasp marks about 35°. There was slight lameness with the right leg, but so little remained of his paralysis that he was at work again as a groom. As to his speech, he acknowledged that he still occasionally, but rarely,

substituted words, and that his tongue would sometimes catch against his teeth in speaking. The facial paralysis of the *left* side, which had existed for two years, remained unchanged.

Two points of special interest in this case were noticed by Dr. Buzzard: 1. The association of hemiplegia of the right side with facial paralysis of the left. 2. The rapid recovery under treatment addressed to a supposed syphilitic cause. As regards the first point, it was remarked that the first glance at this patient gave rise to the idea that the case might be one of cross or alternate paralysis, dependent probably upon lesion of the pons Varolii. But there was a feature which speedily threw doubt upon this view, and drew attention to the trunk of the left facial nerve. When the patient was asked to close his eyes, the left eyeball remained exposed to the extent of one-eighth of an inch, the right eye being perfectly closed. Now, in that form of facial paralysis which is of cerebral origin, and which is constant to a greater or less extent in hemiplegia, the ability to close the eyes (at least simultaneously, if not always also independently) is never lost. This facial paralysis not being therefore of cerebral origin, inquiry and examination easily traced it to injury to the trunk of the nerve, as it passed through the parotid gland. It would seem that the injury took place to the body of the nerve before it divided, as the muscles about the mouth as well as the orbicular muscle of the eyelids were paralyzed. Whether the damage had been done by suppuration or by the surgeon's knife did not appear, but at any rate the nerve had not been completely divided, as the paralysis was incomplete. In reference to the second point, Dr. Buzzard said that the age of the patient, the intense pain in the head preceding the attack of hemiplegia, and the previous history, led to the diagnosis of a syphilitic origin of the malady, the correctness of which the rapidly curative effects of the iodide of potassium had served to confirm. As regards the dose of this drug, Dr. Buzzard said he was in the habit of giving from five to twenty grains three times a day, in such cases as these; and, in his experience, instances in which such large doses could not be borne quite as well as small ones, were very rare. Indeed, he was disposed to think that he more frequently observed marked iodism from small doses of the iodide, such as one or two grains, than when this drug was exhibited in the quantity above described. There were, no doubt, certain persons who were excessively susceptible, but these were quite exceptional, and he rarely met with cases in which great depression was produced by the drug. In the present instance it would be noted that the man had gone on taking large doses of the drug for three months, with a constant increase of health and strength.

22.—*Syphilitic Insanity*.¹ By H. GRAINGER STEWART, M. D., Medical Superintendent of the Borough Lunatic Asylum, Newcastle-on-Tyne.

The three following cases of syphilitic insanity, which came under

¹ Read in the Psychological Section, at the Annual Meeting of the British Medical Association in Newcastle-on-Tyne, August, 1870.

my care in the Newcastle Asylum, are, I think, worthy of bringing before you as illustrative of the remote effects of the taint of syphilis.

CASE I.—J. S., a commercial traveller, aged thirty-five, married with children, was admitted into the Newcastle Asylum on April 1, 1868. He had fair hair, blue eyes, and fresh complexion. His bodily condition and health were indifferent. He had led a very irregular life many years, and at one time suffered severely from syphilis. During the three months before admission, he had gradually become incapable of conducting business. He now believed himself persecuted by enemies, especially men residing at Bradford, with whom he had had business connections. He said he heard them conspiring against him and wishing him ill. He was restless and irritable; frequently heard voices talking with him and about him; he understood all their plots. He slept fairly, but awoke much distressed, believing that he had been subjected to the most cruel processes during his sleep.

After residing in the asylum for a short time, he continued to be the subject of the most extraordinary hallucinations. He heard voices which communicated to him the most foolish and absurd things, all which he firmly believed. He said he underwent nightly a kind of torture, which he called the "cylinder finish," and which he described as an excruciating process, by which his brains were whirled round with extreme velocity, mixed into a pulp, and replaced in his skull just in time for his awaking. This, he believed, was ordered by the doctor, who knew of every thing that was done to him, and had the power of regulating the amount of his sufferings. He was also, he said, frequently put upon the wheel and drugged during the night; and, though he really slept well, he averred that all the time he was vividly sensitive to all the tortures which he thought he underwent. Gradually he became extremely irritable, fancied that insults were offered to him by all about him, secluded himself from the society of his fellows, refused food, was inclined to lie in bed, and threatened to commit suicide. He referred to his head as the seat of his sufferings, and complained of pain at the vertex. Occasionally he was persuaded to take the iodide of potassium in two-grain doses three times daily, but never so continuously as to give it a fair trial.

In the second year of his residence in the asylum, phthisis pulmonalis became developed, and then some improvement in his general health took place. He began to occupy himself in the joiner's shop making toys for his children; and his actual sufferings seemed to obscure the abnormal sensations which so strongly affected him in the earlier period of his disease. Two years after his admission, he died. No *post-mortem* examination was allowed by the friends.

CASE II.—D. T., a woman aged fifty, married, without children, was admitted on April 10, 1868. She was said to have led a dissolute life. She was very much emaciated and unhealthy; her nose was marked by cicatrices. She had suffered from syphilis, and had a bad sore on the leg. The circulatory and respiratory systems were healthy. She was of fair hair and complexion, ate well, and was said to sleep well. It was stated that she had been only a week insane.

On admission, she was in a state of dementia. She was perfect

bewildered, and evidently could not understand the events taking place about her. She answered very slowly any questions that were put to her, and seemed unable to understand when she was spoken to.

Shortly after admission, her mind became filled with singular and painful delusions. She fancied herself constantly persecuted by certain individuals, who day and night made it their business to annoy and hurt her. This they did by using the most ingenious machines, which were specially invented to torture. They were introduced into her body and brain, and worked by means of wheels. She averred that they burnt her brain, drew out her inside, cast her into the air, put their fingers into her, and so tormented her. This for the most part took place in the night; but, if she were allowed to remain in bed during the day, she complained of similar though not such severe treatment. At the same time she heard her tormentors talking together, consulting as to which was the most painful process they could invent. She also heard others remonstrating with them for treating the poor woman so cruelly. She as well saw faces which she recognized as old neighbors, and particularly the face of her principal tormentor, whom she supplicated to desist. The head was referred to as the seat of the pain.

During her residence in the asylum, she has every morning bitterly complained of her treatment during the previous night; and sometimes she gets into great excitement, and threatens to destroy herself occasionally. She refuses her food for days together, with that intent; and once, about a year after admission, was found by the night-nurse nearly strangled by a garter which she had twisted round her neck. She has often prayed the doctor to give her poison to end her sufferings.

She now (August, 1870) continues to suffer from the same or similar delusions and hallucinations. At night, when the nurse shuts the door on her, the operations of her tormentors commence, and so they continue to persecute her all night. She says she is placed on a table and dissected; that her head is opened; and that all the time she sees and hears her tormentors inciting each other to treat her more and more severely. She occasionally receives her medical attendant with a storm of abuse, averring that he was present during the night, and aided her tormentors. The sores on her legs healed up under treatment by a solution of the bichloride of mercury. There has been no improvement of the mental symptoms of any duration, although she has undergone long courses of the iodide and bromide of potassium. The hydrate of chloral, in forty-grain doses, produces deep and long-continued sleep, and seems to relieve the symptoms at the time; but there is no material change in the mental state of the patient.

CASE III.—P. H., aged fifty-eight, single, an Irish laborer, a Roman Catholic, was admitted into the asylum on January 22, 1869. He had served some years in Portsmouth, and had led a very irregular life. He has fair hair and eyes, and is ruddy; he is blind of one eye from wound of the cornea. He has suffered from syphilis; but his general health is fair. He believes that his brother was murdered in the work-house, and that the assassins are now after himself. He fancies that

they are constantly watching him, hiding themselves in the ceiling and under the floors, and even suspended in mid-air overhead. He hears them constantly plotting how they may kill him. One of their favorite modes of attack is by shooting vitriol, ammonia, and "black poison" at him, besides using to his injury other magic and black arts. These persecutions go on principally at night, and the arrangements which he makes for warding them off are worthy of remark. He secures small pieces of wood in the daytime, by which he wedges the door of his room at night, and places his bed so that, should any one attempt to enter, he must be awakened. He envelops his head with his pillow-case, which drops over his face, stuffs his ears and nostrils with cotton-wool, and his mouth with a pocket-handkerchief, and thus, he believes, he keeps out any drug or vapor when he is asleep. All the key-holes, ventilators, and open spaces about the doors and shutters, are also carefully covered with blankets or sheets. It takes him more than an hour every night to complete these arrangements, and when he lies down under his mattress he considers he is in circumstances of comparative safety. He frequently complains of pains in the head, and burning sensations on his skin, which he attributes to his unseen enemies shooting poison on him. He complains during the day, but is worse at night, and every morning recounts some new plan of attack that his tormentors have been attempting. He has been under treatment for eighteen months; but in his, as in similar cases, it is almost impossible to carry out a system of treatment, and no improvement has taken place in the case. He threatens to commit suicide, to put an end to his sufferings; but has never made any actual attempt.

Remarks.—These cases have several characters in common: 1. They all occur on subjects who have suffered from syphilis. 2. The character of the delusion is similar. They all believe themselves the victims of conspiracy, persecution, and cruelty undeserved. 3. They are all subjects of hallucinations of touch, hearing, and sight. 4. They are all suicidal, two of them having made actual attempts on their own lives. 5. They are all dangerous to others when under the influence of their delusions, and were quite unsafe to be at large. 6. They are all worse at night, which circumstance may be dwelt upon as indicating the syphilitic nature of the disease. 7. They all suffered severely from cephalalgia; their abnormal sensations were in the brain. The treatment produced but little effect, and it is feared they can only be looked upon as incurable; but still, by the relief of symptoms, much of the distressing character of the disease may be assuaged.—*British Medical Journal*, October 15, 1870.

23.—*A Case of Traumatic Tetanus; Recovery after the Removal of a Foreign Body from the Wound, and the Administration of Chloroform.* By GEORGE JOHNSON, M. D., physician to King's College Hospital.

H. N——, aged thirteen, a newspaper boy, was admitted into King's College Hospital on the 24th June. Three weeks before, while getting over a hedge, he ran a sharp piece of wood into his thigh. He stopped the bleeding by tying a handkerchief round the thigh. The wound soon healed, and he is confident that no portion of the

pointed wood remained beneath the skin. About nine days before his admission the lower jaw began to feel stiff; this gradually increased until it interfered with mastication. Then the muscles of the trunk and limbs began to be affected with spasm, and he came into the hospital.

On his admission he was well nourished, with a healthy color. There was a peculiar expression of the face, resulting from spasm of the occipito-frontalis, corrugator supercilii, and other facial muscles. He could separate the incisor teeth only to the extent of about half an inch. There was some rigidity of the abdominal and erector spinæ muscles, and movement of the body occasionally increased this rigidity to a painful degree of spasm, the pain being especially severe in the back. The spasm also implicated the muscles of the legs. The temperature, pulse, and respiration, were normal.

At the upper third of the thigh there was a cicatrix about half an inch long, the scar and the tissues beneath felt unusually hard, and pressure caused considerable pain. It was suspected that there might be some foreign body beneath the skin, therefore chloroform was given, and an incision made through the cicatrix by the house-surgeon, Mr. Whitmore, who discovered and removed a small dark mass; this proved to be a piece of woollen stuff from the boy's trousers, which had been driven in, and lodged beneath the skin. The piece of wool was about the size of a small pea. A poultice was applied to the wound, and during the next twenty-four hours no medicine was given. There was continuous rigidity of the muscles, with occasional paroxysms of spasm and pain. He was now ordered to take fifteen grains of chloral hydrate, at first every four hours, afterward at longer intervals. Between the 26th June and the 9th July he had twenty-four doses of the chloral, amounting in all to 360 grains. The symptoms gradually subsided, the spasms became less frequent and less severe, the last slight attack of spasm occurring on the 13th July; the wound healed, and he was discharged cured on the 27th July.

Dr. Cholmeley inquired whether tetanus had any tendency to wear itself out, and to terminate in recovery, if the patient were kept alive sufficiently long.

Mr. Spencer Watson related the particulars of a case of tetanus that had been under his care in the Great Northern Hospital, and that had recovered under the use of chloral in full and frequently-repeated doses. The disease followed a wound of the tongue by a splinter; but the splinter had been removed prior to the occurrence of spasm.

Mr. Brudenell Carter inquired whether the state of the circulation in the optic nerve had been observed by the ophthalmoscope during the chloral narcotism.

Dr. George Johnson briefly replied. He dwelt upon the importance of the removal of the piece of cloth, and admitted that he had neglected to make ophthalmoscopic observations.

24.—*Rupture of Abscess of Cerebellum, causing Compression of the Medulla Oblongata and Sudden Death.* By J. WILKIE BURMAN, M. B., Assistant Medical Officer to the Devon County Lunatic Asylum, Exminster.

William W——, fellmonger, aged thirty-eight. When admitted on April 29, 1868, was found to be suffering from simple dementia. His history, from admission up till about a week before his death, is as follows: He was always harmless and free from excitement; he generally moped about, and seldom or never employed himself usefully; he was much given to turning "head over heels" in the airing courts and ward, and even in bed he could not resist this peculiar propensity. He was also in the habit of jerking his head backward and to the right. On November 21, 1869, about five days before his death, he was observed sitting on a seat in his ward complaining of a violent pain in the head. The pain seemed to come on in paroxysms, for he frequently put his hands to his head, and screamed, groaned, or stamped his feet on the floor. It may be here observed that at this time, as well as up to the time of his death, the patient took his food well, and exhibited no symptoms of constitutional disturbance; and, as no further information could be obtained from him on account of his demented condition, he was simply ordered to be kept under observation. From November 21st to 26th he was, on several occasions, noticed to be in the condition above described; and, for two or three nights before his death, he frequently awoke the other patients who slept in the same dormitory as himself, by his screaming and by his getting out of bed and turning head over heels. On the night preceding the day of his death he was unusually restless and noisy in this peculiar manner. I may here state that it was not unusual for the patient to have two or three turns-over in bed before going to sleep; but it was extraordinary for him to get out of bed to do so, or to scream so as to awaken the other patients.

On the morning of November 26th, at "getting-up" time, the patient asked the attendant in charge of his ward to allow him to remain in bed, as he did "not feel well," and his request was granted. About an hour and a half afterward the attendant brought patient his breakfast, which consisted of a basin of flour-and-meal gruel with a piece of bread; and, leaving him to eat it, went elsewhere. On the return of the attendant, about twenty minutes afterward, to take away the basin, patient was found dead, being slightly livid, and a little froth existing about the lips. The occurrence was immediately reported to the medical officers, who saw him soon afterward and made the following observations: Patient was quite dead, and there was little or no lividity on the face or lips; all the gruel had been consumed as well as half of the bread, the other half lying on the bed near his right hand, which was outside the bedclothes; the left hand was under the bedclothes which were undisturbed; and the patient was lying on his back. There was no bolus of food in the mouth or at the top of the pharynx; and, as the patient was not in any way paralyzed, there was no reason to believe that he had died from accidental choking.

Section cadaveris.—The head and thorax were alone examined. The lungs and heart were found to be quite healthy; the heart was flaccid.—Head: The whole of the cerebrum and its membranes presented healthy appearance to the naked eye. On removing the brain *in toto* from the skull, after the usual manner, a quantity of greenish-yellow

pus was observed to issue from the top of the spinal cavity and from around the cord at that part. The inferior surface of the left lobe of the cerebellum, which was free from adhesions, was found to be of a brownish-yellow color, and its substance softened and disintegrated. The affected part of the lobe had the appearance of a pouch containing fluid, and, on shaking it, visible fluctuation was caused. No distinct hole could be made out, but the tip of the finger could be passed through and between the disintegrated fibres into a cavity in the left lobe, which was duly exposed on section, and found to be about an inch and a half in diameter, and to be partly filled with a greenish-yellow pus of the same nature as that which had already been observed to flow by gravitation from the top of the spinal cavity. The abscess was not encysted, and had no lining membrane. The other lobe of the cerebellum was quite healthy, as were also the medulla oblongata, the spinal cord, and their membranes.

25.—*Heat and Nervous Current.* By NATHANIEL ALCOCK, L. C. P. I., Assistant-Surgeon, 35th Regiment.

July 8th.	{ 97° Morning. 100.4° Evening.	July 13th.	{ 96.6° Morning. 100.8° Evening.
9th.	{ 96.4° Morning. 100.2° Evening.	14th.	{ 96.6° Morning. 103° Evening.
10th.	{ 97.4° Morning. 100.3° Evening.	15th.	{ 103.8° Morning. 103° 4 P. M.
11th.	{ 97.4° Morning. 100.8° Evening.		{ 105.8° 10.30 P. M.
12th.	{ 97° Morning. 98.8° Evening.	16th.	{ 106° 1.30 A. M. 106.6° 6 A. M.

Died at 9.30. A. M.; 104° an hour after death.

Such is the thermometric expression of the life of the patient during the last eight days of his existence, showing a state of intermittent elevation of temperature for the first seven and (with a fractional exception) a continuous increment of heat during the concluding six-and-thirty hours.

Gunner P., Coast Brigade, Royal Artillery, was admitted into hospital on July 2d, in consequence of pain in the front of the head succeeding a debauch, and attributed to the presence of a piece of necrosed and denuded bone, about the size of a shilling, above the right frontal protuberance, the result of previous abscess, probably syphilitic, and which had been like this for a considerable time without producing any inconvenience. In consequence of his complaining of shivering-fits, followed by sweating, and learning that he had never served in any malarious climate, which would have accounted for a relapse of ague, I looked to the thermometer for information, and finding that, although the evening temperature was high, the morning heat invariably fell below the natural standard, I excluded the existence of inflammation, and was unable to understand the readings of the instrument further than that a daily wave of fever passed over the system, probably due to some morbid impression on the nervous centres.

On the 11th and 12th he was up and about, as he was much less affected by the pain in his head, and on the latter day, which was intensely hot, he exposed himself to the sun's rays; yet on that evening his temperature was lower than usual. On the 13th his improvement was checked.

On the 14th he was very ill, pale, sunken, and anxious, yet his morning temperature remained lower than natural; on this evening, however, his temperature reached 103° , exceeding by more than 2° the highest previous reading, and on the morning following he was insensible.

Compression of the brain seemed to be negatived by contracted pupils, flushed face, throbbing temporals and carotids, hurried breathing, quick, full, but very compressible pulse, and by irritability of the bladder, a symptom noticed by Deputy Inspector-General Longmore in incipient sunstroke. Seeing his bed wet with urine, I attempted to pass a catheter, but was prevented by spasm of the neck of the bladder; yet, on withdrawing the instrument, a full stream of urine followed. Similar ejections took place several times during the day. The *fæces* were retained.

The symptoms strongly resembled those of heat-apoplexy, and I believed them to be produced by the recent high temperature acting on a very depressed nervous organism, and that such action was further invited by the existing disease of the bones of the head.

The *post mortem* showed the dura mater attached by recent adhesions to the entire surface of the calvarium, with the exception of one portion extending from the left frontal sinus to a point above the right frontal protuberance, corresponding with the externally-necrosed bone. Throughout this extent it had evidently been long thickened, and was covered on both surfaces with a layer of green gelatinous matter, being detached from the bone, which was white and glistening above, and from the gray convolutions beneath, which were deepened in color, apparently augmented in size, and softened in texture, but free from any infiltration of pus. The subjacent white substance was remarkably white. At the starting-point of this diseased tract, but within the cavity of the left frontal sinus, was a small collection of unhealthy pus, and at its terminus the external necrosis had softened the underlying tables of the bone. The remainder of the dura mater displayed a net-work of bright dilated arteries; the surface of the brain was covered with distended veins. No abnormal accumulation of fluid existed in any of the cavities.

Referring to the thermometric history, we learn the exact date up to which the chronic disease dictated the symptoms, and almost the moment at which they were overruled by the supervening inflammation. Yet we are as far as ever from explaining how, during the first period, the nerve-power, accumulated in sleep, depressed the morning temperature, while its expenditure during wakefulness caused it at evening to ascend; or why each day a paroxysm of fever disturbed the nervous balance. Nor can we yet pronounce by what steps, during the second stage, the abnormal bodily heat, being denied all intermission, was gradually increased till death occurred. The dilated arteries

of the dura mater, the recent lymph, and the distention of the cerebral veins (producing signs of irritation rather than compression) being the sole legacies of that acute stage, we are driven back on the words "disordered function and increased metamorphosis," which mean nothing but our ignorance.

We can only vaguely conceive that an uncontrollable evolution of nerve-force is taking place, without any interval for reaccumulation, and is expressed by extreme rapidity of the heart, which, from consequent exhaustion of its intrinsic nerve-power and inanition of its substance, dies first, leaving, as it gradually declines, so much force unappropriated; and thus the brain, outliving the heart as well as every other structure, pours forth its final currents, which are all unused, and appear as heat, raising the temperature, as the electric fluid does of any body through which it passes.

One fact, I think, we learn—that we are cramping truth by attributing elevation of bodily heat too much to chemical action—which I cannot believe, with Dr. Richardson, is augmented on the cessation of apparent life—and too little to the evolution of the nervous current.—*Medical Times and Gazette*, October 1, 1870.

26.—*Case of Chorea treated with Hydrate of Chloral; Recovery.*
Under the care of Dr. BRITTON, Driffeld Cottage Hospital.

Rose S., aged nine years, came under Dr. Britton's care as a private patient, on January 24th of the present year. She had begun to show symptoms of chorea in the preceding November, which had become gradually worse. When she came under treatment she could neither articulate any words, nor sit still in a chair, nor walk. If left alone, she fell out of her chair. She could not eat, so great was the difficulty in swallowing.

The first treatment, consisting of quinine and iron, with generous spoon-diet, was followed by no improvement.

On the 5th of February she was placed on sulphate of zinc in two-grain doses, which were gradually increased to nine grains, three times a day. But, as she bore this very badly, often being sick after taking the medicine, she was ordered strychnine and iron; and under this she slightly improved in swallowing, but not in walking or talking.

On the 5th of March, in consequence of her parents being unable to provide a sufficiently good diet, she was admitted into the Driffeld Cottage Hospital, where Dr. Britton commenced giving bromide of potassium with digitalis. No improvement following, the strychnine and iron was resumed, but without any apparent effect. She disturbed the patients much at nights by screaming in her sleep, or on suddenly awaking. She was therefore ordered ten grains of hydrate of chloral at bedtime, which procured her a good night's rest, followed by a marked improvement during the day.

This treatment was continued for four nights; and on the 14th of April she was discharged, perfectly well. She was last seen on October 6th, up to which time she had remained quite well.—*Lancet*, November 5, 1870.

27.—*Three Cases in which Contraction of the Pupil was a Prominent Symptom.* Under the care of Dr. J. RUSSELL. (Birmingham General Hospital.)

I lately reported a case of injury to the cervical vertebræ in which contraction of the pupil was a striking phenomenon. I now add the three following cases, which have lately occurred to me. Though they are connected together by the presence of the one symptom I have indicated, they have no other subject of common interest, excepting as they illustrate the various circumstances under which contraction of the pupil presents itself to our notice. Individually, the latter two cases have points of considerable interest. I have to acknowledge the help of my friend M. A. Bracey, of our Eye Hospital, in the first two; in the third, of our house-physician, Dr. Welch.

CASE I.—*Congenital Myosis.*—E. T., aged forty-two, complained of nervous depression and much irritability, with bad sleep. He had no symptoms of a more definite character. I found his pupils contracted to the size of a pin's-point, and I could not produce any effect on them by cutting off the light. Mr. Bracey found that he read No. 1 brilliant perfectly with 16-convex glasses. He dilated the left pupil with atropine, but it did not reach beyond one-half, and remained dilated for six or seven days. The optic disk and retina were perfectly healthy. The man had used the same glasses since he was twenty years of age. He can work without glasses; but his sight is not equally strong in hot weather, and occasionally, though very rarely, fails him for an hour or two.

CASE II.—*Adhesion of the Iris—Former Syphilis—Rheumatic (?) Rigidity of the Ligaments of the Cervical Spine and Maxillary Articulation.*—H. P., aged forty-eight, applied on the same day with the preceding patient, his eyes presenting precisely the same appearance and behavior under light. The pupils were contracted to pins'-points. Mr. Bracey diagnosed adhesion of the papillary margin to the anterior capsule of the lens. The entire neck is fixed by complete rigidity of the cervical column; it is immovable, and of one piece with the chest. The face looks somewhat down, and cannot be raised. The entire cervical region feels perfectly hard, but does not present any local thickening. The patient cannot separate his teeth beyond three-quarters of an inch. His chief complaint is of pain in each side of the cervical region. He has some difficulty in swallowing, the food feeling to stick in the throat; he refers this difficulty to the position of his neck, and this is probably correct. The action of all the cerebral nerves is unimpaired. It is remarkable that all his other joints are quite free from disease. He is very cachectic and anæmic. His heart is healthy. His urine is free from albumen. He is a gardener, and exposed to great alternations of temperature. He had a primary sore on the genitals eighteen years ago, and was salivated for it. Soon afterward he had an attack of rheumatism in his foot, and also severe inflammation, first in the right eye, then in the left; but I do not know of the connection of these three attacks. Twelve years ago he had an ulcerated throat. His present illness began eighteen months ago, with pain in the thick of the right thigh, then in the knee, after-

ward in the shoulder, and finally in all his joints; he has never lost this pain since. The joints have never swelled; there has been no perspiration; his urine has been muddy and high colored at times. His neck became affected in about a month, and subsequently the jaw; these two parts have been progressively stiffening. Fourteen months ago the right eye inflamed, with severe pain; six months afterward the left eye participated, and the sight has remained permanently dim. It is interesting that a seton placed in the neck during the affection of the neck produced a series of attacks plainly epileptic, which necessitated its withdrawal in three days, after which the fits ceased entirely. He had never had fits before.

CASE III.—*Contraction of the Pupils in Conjunction with Cerebral Disease.*—The chief interest in this case lies in its affording an example of combinations of symptoms, not infrequently met with, containing certain of the phenomena which usually accompany locomotor ataxy, yet with so much difference in their grouping as clearly to indicate a different cause. The unsteadiness of the gait, the inability to stand when the eyes were closed, the pains in the lower extremities, might be taken as belonging to an early stage of locomotor ataxy; but, on the other hand, the arrangement of these same symptoms, and the absence of change in the ocular apparatus, both visual and motor, would alone have thrown doubt on the diagnosis of ataxy; and the other symptoms of the case come in to negative the hypothesis altogether. It is worthy of note that Trousseau's "method of distinguishing the muscular co-ordination of locomotor ataxy from that which results from some kinds of cerebral disease" failed in this case, as it did in the one by Dr. Lockhart Clarke, from whom I quote this sentence (*St. George's Reports*, p. 92): "If the patients," he (Trousseau) says, "be placed upright, with the feet close together, and then shut their eyes, the ataxic patient will stagger and fall; but the one who has disease of his cerebellum will perfectly maintain his equilibrium" (*vide* also Dr. Wilks, *Medical Times and Gazette*, vol. ii., 1868, p. 578). This diagnostic mark was also contradicted in my present case.

J. W., aged forty-three. He has been subject for two or three years to the "rheumatics"—pains in his legs, which sometimes had an aching, sometimes a darting character. The pains occasionally, but rarely, rose above the knees; they were sufficiently severe sometimes to keep him awake at night. While in the hospital, he had an attack of pain, which occurred in paroxysms, and "made him sweat." He then pointed to the left anterior superior spine of the ilium as the seat of chief suffering. He has also had some pain in his left hand, but not of moment; but his left hand has felt numbed, sufficiently so to render him awkward in picking up hairs in his work. The right hand has never been affected. Occasionally, in walking, the left leg, sometimes the right also, would give way; but he could walk for miles. He has also had some tendency, during these two or three years, to incontinence of urine, and it is doubtful whether the sphincter ani may not have participated slightly. He has never had headache; he made no complaint of giddiness; his vision has not been affected in any way, excepting that sometimes, when in pain, "dulness has come over his

eyes." For the last twelve months his memory has been sufficiently impaired to be noticed by his shopmates. Swallowing has never been affected.

Ten weeks before admission he was seized suddenly with a fit of dizziness, which left his left arm weak, and rendered him unable to walk without help; he staggered as if drunk; the pains in his limbs became more severe, and he went to salt-water baths under the impression that his complaint was rheumatic. Three days ago a second and more severe attack of dizziness occurred. He denies having had syphilis, but lost his hair and eyebrows sixteen years ago, and at that time had an abscess in his throat.

We found some weakness of the left arm; but his chief symptom concerned his lower extremities. He stood quite steadily when his feet were placed together; he raised them well in walking, but had to separate his feet somewhat, and was liable to stagger, especially when turning round. This tendency was greater when his eyes were fixed on the ceiling; his legs were then kept separate to maintain his balance; he walked with his body bent a little forward, and his gait became more rapid as he advanced. With his eyes blindfolded, or even with them closed to enable us to test his pupils, his body immediately began to sway, and required support to prevent his falling. Sensation was repeatedly tested in the lower extremities. The result was somewhat uncertain; but, at the most, interference with tactile sensibility was very slight. Electric irritability and sensibility were low. His urine was not fully retained; occasionally he wetted his bed. His urine was free from albumen and sugar. The aspect of his face was wanting in expression, his speech was rather drawling, and his memory somewhat defective; he had, in fact, the character of a man in the early stage of general paralysis. The various cerebral nerves were healthy. The senses were healthy; but there was marked contraction of the pupils, which could not be induced to dilate beyond one-quarter, though repeatedly experimented on. By atropine, however, they dilated fully. Sight was good, and accommodation extended from seven to sixteen inches. Dr. Welch found the optic disk quite healthy.—*Medical Times and Gazette*, October 1, 1870.

II.

ANTHROPOLOGY.

1.—*Stone Agricultural Implements of the North American Indians*. CARL RAU. Archiv für Anthropologie, vol. iv., p. 1.

Cuts are given of a shovel-blade, over a foot long, five inches broad and three-fourths of an inch in thickness; and of a hoe, measuring seven and a half by nearly six inches, and one-half inch thick. Both are very symmetrical; the shovel reminds one of an elongated olive. Evidence that they were actually used in agriculture is furnished by the polish or glaze which the parts nearest the edge have received, and by innumerable fine scratches in the direction in which the blades move.

have been thrust into the earth. They are made of a peculiar bluish-gray flint with conchoidal fracture. All the author's collection was made in St. Clair County, Southern Illinois, except one specimen which was found in the excavations made by Fremont around St. Louis.

The period of the mammoth and that of the reindeer in France, Belgium, and England, furnish no specimens of flint implements of such magnitude. The author believes that the only similar objects of equal size are the flint axes of Scandinavia and North Germany, which belong to a later period.

In 1868, about fifty hoes and twenty shovels, similar to those depicted, were found in East St. Louis, a mile and a quarter from the river, lying under eighteen or twenty-four inches of black loam, in a hollow scooped in the sandy layer of soil underneath. They evidently had never been used.

In one of a group of mounds, on Paint Creek, in Ross County, Ohio, an enormous quantity of round, oval, or cordate disks of hornstone lies deposited. Many of these pieces of stone are extraordinarily like the "flint axes" found by Boucher de Perthes and Rigollot in the valley of the Somme. But the rudeness of these European specimens points to a lower grade of culture; while these, and similar American specimens, must be regarded as unfinished work, laid by in the earth for the purpose of concealment, or perhaps with the object of softening them under the influence of soil-moisture, and thus rendering them easier to work.

Many of the historical tribes of aborigines raised large crops; upon the lakes, of rice; elsewhere, of maize. In 1687 the Marquis de Nonville is said to have destroyed 1,200,000 bushels of maize belonging to the Senecas.

2.—*Megalithic Structures of the Channel Islands: their History and Analogues.* Lieutenant S. P. OLIVER. (Quarterly Journal of Science, April, 1870.)

The word "cromlech," as used by the English antiquarian, signifies the same as "quoit" or "coit." Prof. Sven Nilsson defines the English cromlech as synonymous to the French *dolmen*, the Scandinavian *andöls*, and the *dyss* of Denmark, consisting of one large block of stone, supported by from three to five stones arranged in a ring, and intended to contain one corpse only, several of these *dorsar* being sometimes enclosed in circles of raised stones. But the late Dr. Lukis assigns the word to all elaborate megalithic structures of one or more chambers, in which category the passage-graves may be included. Nilsson has clearly pointed out how the gallery or half-cross tombs are close imitations, if not actual adaptations, of the original dwelling-houses of the ancient pre-Celtic Scandinavians, a people not dissimilar in their mode of life to the present Arctic nations of Eskimaux; also how these galleried huts were but make-shifts in the plains for subterranean caves and grottoes in the mountain-region whence their race originally sprang.

As regards the cromlechs in the Channel Islands, their chief characteristics are in brief as follows:

1. The large western chamber, composed of slabs of granite, from

six to eight feet high, arranged in a circular or horseshoe form, supporting a cap-stone, which is the largest stone in the whole structure— Sometimes this chamber is divided into smaller compartments, or kists—

2. The covered gallery, leading to the great west chamber from the east. This is composed of stones largest at the end next the chamber, and diminishing in the eastward direction.

3. Kists have sometimes been added, at a later period, outside of the main structure.

4. A stone circle (peristalith), the centre of which is usually in the western chamber, surrounds the whole. The circles are of the same dimensions, viz., sixty feet, throughout the islands.

5. All the cromlechs were originally covered with a tumulus of earth, but a large proportion have been denuded of their earth-mound, either by accident or design.

Within these cromlechs are found thick concrete layers of limpet-shells; a vast quantity of human bones, with bones of animals; rude pottery and stone (but never metallic) implements. The position of skeletons indicates that they were buried in a sitting posture, similar to those found in the Scandinavian tumuli.

One curious characteristic of these monuments may be noticed more in Guernsey than in Jersey, viz., that the majority of these structures are within sight of one another. It is possible that signal-fires may have been used in connection with them.

As suggestive and parallel examples, may be instanced the methods of sepulture practised up to this day by the Hovas, the inhabitants of the mountainous plateaux in the interior of Madagascar. The Hovas begin to erect their tombs in early life, and make their completion through a series of years one of the most important objects of their existence, as an effectual means of being held in honorable remembrance by posterity. These tombs are family vaults or catacombs. In the selection of a site, publicity and elevation are the two principal points sought for. Sometimes a tomb is placed immediately in front of the house of the person by whom it is built; thus the tombs of the kings are within the precincts of the palace at Anantanarivo. The site having been chosen, an excavation is made in the earth, and a stone vault made, the sides and roof of which are composed of *immense slabs of stone, unhewn granite, flat at least on the inner side. Each side of this kist, sometimes seven feet high and twelve feet in length, is often formed of a single stone.* The entrance, always to the north or east, is closed by a large upright block of stone. This stone sepulchre is covered over with earth, and, by means of stone copings gradually diminishing, presents from the exterior a pyramidal form.

The idol-keepers are acquainted with the cleavage of the granite and syenite rocks, and, taking advantage of the circumstance, they mark out the dimensions of the slabs by lines upon the surface of the cliffs, and cause large fires to be made along these lines. When the rock has become heated, water is dashed upon it; by which means, and with the help of levers, large masses are detached. Sometimes five or six hundred men are employed in dragging a single stone, the

progress of which is facilitated by wooden rollers, and by an immense shouting and sprinkling of holy water.

Large quantities of property are interred with the corpse of any man of note. A grave is dug in the stone tomb, and a quantity of *fresh charcoal* is placed on the body. The Hovas also erect stone pillars not dissimilar to the *Menhirs*, some of which are of considerable size.

It is suspected by several observers that the European gallery-tombs were, in some instances, merely ossuaries, or repositories of bones. Certain customs among the Hovas may serve to throw some light upon this subject. In Ankova, the bodies of lepers are first buried in an indifferent spot for twelve months; they are then dug up, and their bones, carefully cleaned, are deposited in the family vault. The bones of slain warriors are likewise carefully cleaned and brought home for interment; but, when the body cannot be found, a cenotaph is erected, the fourth side being left open for the disturbed ghost to enter and repose.

Certain small tumuli, or, rather, cairns, surmounted by an upright stone pillar, and generally overgrown with thickets, are regarded with superstitious fear by the natives of Madagascar. They are considered by them as relics of the Vazimba, the supposed aborigines, who supply the same part in the Malagasy legends that the Lapps do as pigmies in the northern Sagas. There is little doubt, however, that these Vazimba were the Hovas themselves. It is curious that both in Europe and in Madagascar the prehistoric tumuli should be referred to these dwarfs and elves; thus in Sweden we have goblin caves and pigmy hillocks, and in the Channel Islands we have Pocquelaye, Creux des Péas, etc.

Who or what this ancient people were who have left behind them their cromlechs and circles, Menhirs and tumuli, whether they are the same people who used the stone implements called celts, remains for the present undecided.

These *celts* comprise all chipping or hewing stones, which, according to their various modifications, may have been hatchets, axes, chisels, adzes, or wedges, and they have been found throughout the Channel Islands in such numbers as serve to show how universally they were used as household implements. They all belong to the Neolithic period of the Stone age. Mr. Lukis has obtained 197 specimens; besides which, great numbers of fragments have been collected. The materials of which they are composed prove that they were often imported from distant countries. Those made of *fibrolite*—and which have been found in France, England, and the Channel Islands—are especially remarkable from this point of view, for the nearest spot where that mineral is attainable would seem to be the *Carnatic*. A great variety of superstitious notions have been attached to these stones in different countries. A very frequent name for them is “thunder-bolt.”

3.—*Anatomical Examination of a Bushwoman*, by Profs. LUSCHKA, A. KOCH, and E. GÖRTZ. Abridged from vol. iii. of *Archiv für Anthropologie*. (*Anthropological Review*, January, 1870.)

The Bushwoman Afandi, who, during her tour through Germa became known to many naturalists and physicians, died in the summer of 1866, of a pleurisy, at Ulm. The body was immediately transferred to the anatomical theatre of Tübingen, for examination. The language of this woman is said to have consisted of an almost uninterrupted succession of clicks and explosives.

The details are given in three inaugural dissertations by P. Luschka's pupils, and in an essay by Luschka on the external general organs of this woman. Subjoined are the general physical characteristics.

Height, four feet two inches three lines; *weight*, seventy-five pounds eleven ounces; *color*, light-brown; *mammae*, not pendulous. The areolae have a diameter of one and a quarter inch, is irregular, with wrinkles more concentric than radiating; the nipple but little prominent.

Face.—The flatness of the nose, the width of the interocular space and the projection of the cheek-bones, form its most striking characteristics. The iris is of a bluish tint. The ear is well formed, and by no means of a simious shape, as described by Cuvier and Müller.

Skeleton.—The cranium is dolichocephalus; greatest length, 1 cent.; greatest breadth, 12.5; index = 70. The face is prognathous; its length is 10 cent.; breadth, 10.5. The nose is flat, but the maxillary bones are not coalescent; the cheek-bones very prominent. The teeth are white, well preserved, and not deviating from the dentition of a European. With reference to the rest of the skeleton, it is remarkable that the anomalies seen in several parts of the skeleton of the Hotter Venus were not observed in that of Afandi.

The elbow fossæ were not perforated. The calcaneum had a Negro or simian form; but the astragalus was distinguished by its elegant shape, and the small convexity of the superior articular surface. The vertebral column, exclusive of the cervical portion, was much stretched, especially the lumbar region. The heads of the ribs, especially of the middle ribs, were unusually large. The pelvis has a rounded form, and thus agrees with the two exemplars described by Müller. It quite resembles the pelvis of a Negress, aged thirty-seven, delineated by M. J. Weber, in his work on the forms of the pelvis in different races.¹

Brain.—Weight of the fresh brain after removal of the membranes 28 ounces; after remaining for a year in alcohol, 24 ounces 5 drachms. Measurements (i. e., of the inner cranial capacity of a gypsum cast) greatest length, 15.5 cent.; breadth, 11.5; height, 11. Proportion of weight of brain to that of the body = 1:43.29. In a European woman, aged thirty-eight, the proportion, according to Tiedemann, is 1:44.89; and of six other European women there was only one—very thin—with a proportion 1:28.45 superior in this respect to the Bushwoman. The author, Koch, gives no particulars touching the convolutions of the hemispheres, but refers the reader to Luschka's *Handbuch der Anatomie*. To judge from the drawing, the brain was by no means poor in convolutions.

Steatopygia.—Few indications are found in anatomical literature

¹ Lehre von den Ur, und Racenformen der Becken, etc. Tab. xvii.

the height of the fatty cushion, and especially the distance of its extreme point from the vertebral column. Barrow gives it in one case at 14.4 cent. In the Hottentot Venus the height of the buttocks amounted to 16.2 cent. In the Afandi, the projection above the lower lumbar region is no more than 7 cent. The thickness of the steatopyga itself, after lying in alcohol about a year, amounts, in its thickest parts, to 4—4.5 cent.; in most places it is 3—3.5, and in the thinnest portions only 2 cent. The fatty mass overlies the rigid glutæa and sacrococcygea, and is continued on the regio coxalis; and the external parts of the upper thigh end gradually in a common panniculus. It is thickest in the region of the iliac crests and over the glutæi maximi, and thinnest at the lower border of the fundament, where corpulent individuals of the Caucasian race present a greater thickness of subcutaneous fat. Hence it results that not only is the quantity of accumulated fat greater, but that its distribution differs from that in the European; for, in the latter, the arch gradually increases from the iliac to the sulcus glutæus, while in the Hottentot it flattens downward toward the posterior femoral surface. It is owing to this circumstance, and to the sudden transition at the iliac crest from the greatest thickness to the common panniculus thickness, that the steatopyga appears more striking and imposing than might be expected from the comparatively not very great difference in thickness. As regards the structure of the steatopyga, the author makes the following remarks: "In the European, the muscles of the part are separated from the panniculus by the fascia glutæi, which shows itself above the glutæus medius in great strength, and with a tendinous glitter, but is very thin over the maximus, and adherent to the fleshy fibres. In the Afandi, the strong fibrous stratum which covers the glutæus maximus consists of three different surface-spread fibres. Between this fibrous lamina and the dermis, the fatty tissue is interposed, which resembles not by any means a common panniculus adiposus, but much more that of the sole of the foot or of the mammary gland. There proceed, in fact, from the fibrous lamina, numerous processes which coalesce with the stratum reticulare of the cutis, but have many connections with each other. This arrangement of connective-tissue laminæ is not quite irregular, but presents, especially in the thickest parts, three superposed strata, which diminish in height as they approach the skin.' This structure renders it, in the opinion of the author, alone possible that the fatty cushion retains, despite gravitation, its greatest arch upward; and he therefore denominates the above-described fibrous laminæ *ligamenta suspensoria steatopygæ*.

The Hair of the Bushwoman compared with other Hair-Forms.—The author, Gætte, examines the hair of the Europeans, Negroes, of the Bushwoman, of the common sheep, and of the Rambouilletback. As regards the hair of the Negro and that of the Bushwoman, he finds that of the Negro to consist of a non-woolly upper growth, while that of the latter consists only of a coarse woolly under-hair.

The External Generative Organs.—The mons veneris, very slightly arched, and not much deeper in color than the rest of the body, has very few short hairs. The labia majora are without hairs, and reduced

to such a minimum that they seem to be absent. The clitoris has length of twenty-six millimetres. The labia minora lie, therefore, open in foetal form, and form the equivalent of the rima pudendi. The nymphæ proceeding from the præputium clitoridis have a height (equivalent to distance of the attached border from the free edge) of 3.85 cent. and a length (i. e., of the attached border) of 6 cent. Both nymphæ laid together in the median line, form a nose-like prominence. Posteriorly and inferiorly, both nymphæ conjoin in the frænulum vulvæ.

4.—*The Forefathers and Forerunners of the English People.* I Prof. HUXLEY. (Abstract of a Lecture, delivered January 9, 1871 and quoted in the *Anthropological Review* from the *Pall Mall Gazette*.)

After some comments on the political and social significance attached of late years to the question of "Celt and Saxon," the distinguished lecturer drew a brief historical picture of the course of events which influenced the distribution of the population of Britain and Ireland, from the time of Julius Cæsar down to the present day.

He considers the Picts as more probably a Teutonic population derived from Scandinavia or North Germany. With their allies, the Scots, they harried and ravaged all Scotland north of the Firth of Forth and Clyde so effectually, that the Celtic element in Caithness, Sutherland, and the east coast of Scotland, must have been practically abolished.

Upon the eastern and southeastern coast of Britain, which was most exposed to the invaders, the Celts seem to have been absolutely exterminated over vast districts. Later conquests were effected without the destruction of the primitive race, and in the western parts of England and Lowland Scotland, as well as in Wales and the Highlands, the change of blood effected by the Saxon and Danish conquests has been, on the whole, insignificant.

What new blood the Normans introduced was Celtic as well as Teutonic. They and their language have alike been smothered in the English nationality, which, from the facts which have been stated, it is simply absurd to call Anglo-Saxon.

The Norsemen and the Danes, in the lecturer's opinion, infused a large share of Teutonic blood among the Irish people. Then came the Norman conquest, and the spread of Normans and Englishmen among the landholders of the country, by intermarriage, force, or fraud. The English policy was to set up an England in Ireland, which should be strong enough to keep the native Irish in check, but weak enough to depend on the support and execute the will of the English government. The body of English colonists, however, did not remain distinct, but were merged in the mass of the original inhabitants. It is probable that, in the middle of the seventeenth century, after the savage treatment of the natives by Cromwell, the population was reduced to less than a million. Cromwell confiscated and parcelled all Ireland—except Connaught—into shares, which were allotted partly to a stock company called the "Adventurers," and partly to the soldiers.

"I believe that I am affirming," says Huxley, "no more than the facts warrant for, if I declare that a native of Tipperary is just as much

or as little an Anglo-Saxon as a native of Devonshire. . . . We have absolutely no knowledge of the relative proportions of these two parties (Celts and Teutons) in England and Ireland; but it is quite possible, and I think probable, that Ireland, as a whole, contains less Teutonic blood than the eastern half of England, and more than the western half. . . . As an ethnologist, I deny that there is sufficient proof of the existence of any difference whatever between Celt and Teuton."

In defending this rather startling statement, the lecturer remarked that the Kelts (Gauls, Galatæ) were described by the ancients as tall, and possessing fair hair of a reddish or yellow tinge, blue eyes, and fair skins. All Teutonic-speaking people, whether Angles, Saxons, Danes, or Norsemen, possessed the same characters. He was unaware of any evidence of the existence of a dark-complexioned people speaking a Celtic dialect outside of Britannia (Ireland). In France, Ireland, and England, the dark stock predominates in the west and south, the light in the north and east. The dark stock is probably descended from the people called Iberians in Spain, Basques in France, Silures in England, Milesians in Ireland—the primitive inhabitants, who were conquered by the Celts, and in consequence lost their primitive language (the Basque) everywhere except in Southwestern France. Which is the Aryan element, and which the Iberian, in the English people, none can tell. The Iberian language has been obliterated, and the Celtic (in England, at least) has shared the same fate; but the descendants of the men who spoke these tongues survive.

The publication of this lecture in the *Pall Mall Gazette* called forth a lively controversy. "A Devonshire Man" indicates the claim of his countrymen to be considered more Anglo-Saxon than natives of Tipperary. The conquest of Exeter took place nearly 1,000 years ago. The number of Anglo-Saxon names of places is very great in Devonshire, as compared with Ireland: Celtic prefixes are very common in Cornwall, very rare in Devon: the Devonshire dialect is peculiarly Saxon. Prof. Huxley, in return, quotes from Freeman's "Norman Conquest of England" (among other remarks) as follows: "There can be no doubt that the great peninsula stretching from the Axe to the Land's End was, and still is, largely inhabited by men who are only naturalized Englishmen, descendants of the Welsh inhabitants," etc. Huxley says, indirectly, that there has been "a strong infusion of Anglo-Saxon blood in Devonshire;" and that the Anglo-Saxons "have been the dominant stock since their invasion of Devonshire;" admissions which his opponent turns to profitable account, quoting at the same time the professor's remark: "We have absolutely no knowledge of the relative proportions of the two parties," and suggesting that we have grounds for inference, if not for knowledge.

Dr. Beddoe, President A. S. L., remarks that "the Kelts of Huxley are the Kimri of Broca, and Boudin, and Edwards. He (Huxley) supposes the Milesians to have been Iberians, partly because, as he says, they were black-eyed and black-haired; though McFibbis, the best authority (if anybody can be called a good authority on so uncertain and obsolete a question), said distinctly that the Milesians were 'white

of skin, brown of hair,' and that the Firbolgs (usually, but do considered to be Kelts) were black-haired. He thinks 'the Pl Teutonic; it is an open question, but hardly anybody else t nowadays.' Again, we possess monumental portrait-figures, al tainly intended to represent the men of Remi (Rheims), who, a to the professor's interpretation, were Kelts. They are give men, with long faces, and well-marked and somewhat sharp very much like those of the Walloons; whereas the terra-cotta the Roman period, dug up near Xanten in the Lower Rhine resemble the modern Germans of that region, and are not being English in aspect, while they differ much from the Remi as from the Italians." As to the difference in *complexion*, etc., ' the Gauls *raddled* their hair; secondly, Caligula, wishing to the Roman populace with the semblance of a triumph over C bought the tallest Gallic slaves, and *dyed their hair*."

5.—*Races in Devon and Cornwall*. By JOHN BEDDOE, M. I dent A. S. L. (Anthropological Review, January, 1870.)

Dr. Beddoe infers from historical evidence that Devon rem a long time a sort of border-land or march, probably not very peopled, in some parts or villages of which Saxon or Saxoniz nists settled down *en masse*, giving English names to their lo while elsewhere invading thanes ruled over British churls and t British land-owners were left undisturbed in their estates. Bide its neighborhood were probably among the earliest acquisition Saxons; hence, the adjacent (northeastern) portion of Cornwall in local Teutonic names, which are hardly found at all in oth of the county of Cornwall, although it was thoroughly reduce the Norman Conquest.

"I come now," says Dr. Beddoe, "to the physical characte the people, as they appear to a stranger approaching from the e comparing them with those of strongly Teutonic counties, Norfolk, Kent, Hampshire, or part of Wiltshire.

"The most notable points are perhaps the greater squarene chest and shoulders; the prevalence of dark and the frequ black hair; and the greater breadth of the cheek-bones and an of the lower jaw. The form of the head also is, as a rule, notab ent from the very regular oval which is so general farther east, difference is one which escapes ordinary methods of com measurement; it is in the direction of being oblong or per rather than oval. In North Devon, the heads of the peasax large, and not unfrequently broad. . . . The Cornishmen, as are taller and larger than the Devonians, the purer breed su the more crossed one, which is a fact not consonant with a doctrine on the subject. So great, indeed, is the difference, th the Cornishmen overpass the average stature of Englishmen, th nians, taking the whole county together, apparently fall below it, by reason of their compact and well-built frames, they are apt t heavily in proportion to their inches. These statements may, be depended on, being founded on upward of five hundred

tions, without reckoning those on the weight of miners, made by Dr. Barham, of Truro.

"On the whole, forms, features, and complexions, are somewhat softer in Devon.

"With respect to the color of the eyes and hair, I have made about four thousand observations. As a rule, the hair grows darker as one proceeds farther west; and, in Cornwall, this applies to the eyes also, though in a less degree. In some parts of Devon, that counter-changing of colors, which is regarded by some French anthropologists as an indication of the recent crossing of a blond and a dark race, is very observable, blue or light-gray eyes accompanying very dark hair, and, less frequently, hazel eyes light-brown hair."

In the neighborhood of Bideford the population have dark hair in about the same proportion (twenty-nine) as rules in the west-midland counties, where a pretty strong infusion of Saxon blood is generally recognized. In thirteen other places or districts in the west country, the prevalence of dark hair was indicated by numbers ranging from forty-three to sixty-five (per cent. ?).

6.—*On the Character of the Voice in the Nations of Asia and Africa, contrasted with that in the Nations of Europe.* (Abstract of a Lecture, delivered by Sir DUNCAN GIBB, before the Anthropological Society of London, December, 15, 1868.)

The voice of the Chinese and Japanese is of low power, feeble compass, and whining in its tone, possessing at times a sort of metallic twang. Among the natives of Tartary, Thibet, and Mongolia, the voice is stronger, louder, more powerful, yet still partaking of the metallic twang; the female voice is not inferior in power to that of the male sex; the metallic and deafening tones of the voice in those peoples are a well-marked and distinctive peculiarity. In India and Bir-mah, the voice is generally soft and very feminine, not so powerful as shrill; the natives of the hills have a more robust voice than those in the plains—the former possessing a somewhat metallic twang, and the latter a plaintive and whining tone. In Africa the larynx of the Negro is of intermediate proportions between the Chinese and Tartars, but differs from all other races of mankind in certain peculiarities. The Negro lacks vocal power in whatever part of the world he is placed, but possesses the elements of a bellowing or roaring voice—a deafening noisy sound, without harmony or distinctness. In speaking, the voice is smooth and harmonious, or rough and husky. Considered generally, the various nations of Europe possess strong, sonorous, and clear voices; variations as to character and tone may, and do exist, but, as a rule, they all agree in power, full compass, range, clearness, and loudness of sound. The German has the most powerful voice in Europe, for reasons which the author gave; but in strength of voice he must yield to the Tartar, who, without exception, has the most powerful voice in the world. The condition of the larynx, with the length of the vocal chords, and other circumstances bearing on the subject in the various nations of the three great continents, were considered, and the reasons given for the general conclusions arrived at.

In the discussion which followed—

Mr. Pike thought that the difference in voice, between the Germans and the English, was to be attributed as much to differences of mental constitution as to difference of vocal organs.

Dr. Carter Blake remarked on the difficulty which the Negro and mixed races in Central America experience in pronouncing English and Spanish, while they pronounce French with great facility. The Spanish *v* they do not pronounce as a Spaniard would, like a variation of the *b*, but as a direct coarse *b*. He conceived there might be some relationship between the thick lips of the Negro and the difficulty of uttering labial sounds. They had also great difficulty in pronouncing the Spanish *j* like the Greek *x*, but sounded it like *k*. These difficulties were experienced alike by Negroes of pure blood and by mulattoes, while they had no difficulty in pronouncing the vowels of the French language; the French *u*, in particular, they pronounce more correctly than most Englishmen could do. The "Caribs" of the Maricao coast talk a mixture of French and a harsh native, frequent Wulwa, language; yet they change from the one to the other with facility which few Englishmen could rival, though the English as Spanish they cannot speak with accuracy, which he attributed to some anatomical peculiarity.

Dr. Rowdon considered that Sir Duncan Gibb attached too much importance to the anatomical construction of the larynx, and too little to other parts that were essential to voice. The nasal organs, for instance, had a wonderful influence on the voice; and there was great advantage in having large powers of expiration and inspiration, which had a marked influence on the voice.

Dr. Charnock said he had some acquaintance with most of the peoples of Europe, and the loudest voices that he knew of were those of the Venetians and the Neapolitans. The term Tartar was very vague, there being thirty or forty different denominations of Tartars. When at Kasan, he had not observed any thing peculiar in the voice of the Tartars there.

Mr. McGrigor Allan thought that the paper did not do justice to the Negro, who had a most musical voice. The character showed him to be far removed from the ape, which uttered a sound that was extremely harsh and dissonant.

Mr. G. Campbell said that his impression, after a long residence in India, was that the voice of the Indians was very good, and, like that of Europeans, capable of being very well modulated. He had had great opportunities of noticing the voices of the Bengalese when speaking the English language in the law-courts of India, and he considered their facility in the use of English was marvellous; and their voices were as strong as those of Englishmen, in proportion to physical strength. The exactness with which they pronounced English words was superior to that of any European race, except the Low-Germans of the north, which was the more extraordinary as they had not the free social intercourse with English people which many foreigners possess, having been merely taught it in schools.

Sir Duncan Gibb, in replying to the remarks on his paper, said that

many of the speakers had confounded the elements of speech with the voice, the character of which was a totally different thing from the capacity of speaking different languages. He referred to the diagrams to explain further his observations on the voice of the Negro, the sound of which, owing to the peculiar position of the ventricles, could not be reverberated to the same extent as in the cavern-shaped ventricles of Europeans. It was the anatomical peculiarities of the larynx which regulated the character of the voice in various peoples. In the Chinese the voice of the men approached that of the females, because the larynx was shallower than in Europeans.

7.—*On the Influence of the Etruscans and Greeks upon the Bronze-culture.* DR. C. F. WIBERG, of Gefle. (*Archiv für Anthropologie*, vol. iv.)

Worsaae considers that the Danes, Swedes, North Germans, and a part of the Middle Germans, formed a group of nations during the bronze period, characterized by the manufacture of bronzes equal in taste and workmanship to those of most other countries. Nilsson, on the contrary, thinks that their bronzes were obtained by commerce with the Phœnicians.

While the latter nation was the probable agent in introducing the bronze-culture into the countries bordering on the Mediterranean, there is no proof (says Wiberg), in any passage from classic authors, that they extended their traffic to more northern regions; nor does there exist any monument north of the Alps, of undoubted Phœnician origin. But, in proof of the Grecian and Etruscan origin of the northern bronze instruments, the following facts are adduced:

The northern bronze is composed of a mixture of nine parts of copper and one part of tin. The Grecian bronze has the same composition.

The Grecian sword (*ξίφος*) was of a lancet-shape, or leaf-shape, and usually about one and a half foot in length. The same pattern is depicted by Etruscan artists, in their representation of Greek swords. The northern swords, though of greater length, closely resemble the Grecian. A triangular dagger, of very peculiar shape, is common to both regions.

Bronze swords of demonstrably Phœnician origin have nowhere been found.

The discovery, by Noël Des Vergers, of an Etruscan tomb at Caere enables us to draw a most striking comparison between Etruscan and northern art. The tomb is twenty-five feet square, and the walls are covered with a great number of stone figures representing various tools, weapons, musical instruments, etc., cut in relief, and painted of the proper colors.

The bronze articles found in the pile-dwellings of the Lombard Lakes, in the Terramara on the banks of the Po, in Germany, Switzerland, and Scandinavia, present the closest resemblance in numerous instances.

The Etruscans possessed a commerce of great extent and importance, which supplied them with amber from the Baltic Sea, ivory

from Africa, tin from the Cassiterides, purple from Tyre, and vases and amphoræ of the purest and most elegant design, characteristic of the Greeks.

Tarentum, Brundisium, Syracuse, were noted for the fabric of bronze. Bronze celts, resembling those of the north both in shape and composition, have been found on the Apulian coast. The art was probably not practised in Magna Græcia prior to the sixth century B. C. By way of Brundisium, the Adriatic, Patavium, the Po, the Alps (in whose passes a variety of bronze implements have been found), and along the banks of the Inn, the Rhine, or the Danube, the traffic in bronze-wares was carried on. The valley of the Adige is rich in Greek and Etruscan remains of this class. Still farther north, in Hallstadt, over six thousand objects have been dug up from graves probably dating from the first five centuries B. C. Many of these objects give proof of their Etruscan origin, though the greater part are referable to the native industry of the Alanni. In Bohemia, Hungary, and Scandinavia, occasional proofs of undoubted Etruscan workmanship exist.

As for the Phœnicians, there never was a style that could properly be said to belong to them. They borrowed from the Egyptians, the Assyrians, the Persians, and finally from the Greeks, but did not originate new ornamental forms, either in architecture or the other fine arts. (Cf. *Rénan, La Mission de Phénicie*; Paris, 1864.) The Phœnicians were strangers to the geometric ornaments which characterize the bronze period (the spiral, ring, wheel, bow, zigzag, etc.). The fundamental elements of the ornaments belonging to the bronze age are found among the Greeks, especially during the period of archaic art and among the Etruscans.

Certain bronze articles are found to improve in excellence of workmanship and purity of style in proportion as they are found farther north. The author considers this as an evidence rather of freer commercial intercourse, by way of the Baltic, for example, than of a skill in fabricating bronze superior to that of their contemporaries in middle Europe.

Lindenschmidt, the junior editor, confirms Wiberg's conclusions by some original observations of his own.

8.—*Hair as a Differential Element in Certain Races.* By J. BARNARD DAVIS, M. D., etc. (*Anthropological Review*, April, 1870.)

Pritchard ("Polynesian Researches") says: "Fiji is especially remarkable as the group where the black and the copper-colored races—the Papuans and the Polynesian Malays—come into immediate and direct contact, and more or less assimilate by intermixture. The skin of the pure Fijian is dark, rough, harsh. His hair, naturally black and copious, is bushy, persistently frizzled, almost wiry; indeed, it seems something between hair and wool. His beard, of the same texture, is equally profuse and bushy, and is his greatest pride. . . . The skin of the pure Tongan, or Samoan, is a dark reddish brown, smooth and soft. His hair, though naturally black and copious, is coarse, seldom wavy, generally straight. He is almost beardless, and abhors a hairy chin."

In another place he remarks: "The allegation, which has found

favor with some ethnologists, that the hair of certain islanders of the Pacific (variously described as Oriental Negroes, Negrillos, Negritos, and Papuans) grows not equally spread over the scalp, but in tufts, with bare spots between, is one which I very much question. So far as I have been able to learn, the hair grows spread equally over the scalp; and I think it will be found that the 'separate spiral tufts' are directly the result of an artificial process." He goes a step further, and is inclined to think that all kinds of human hair may be trained to present the appearance of the hair of these islanders—i. e., either the separate spiral tufts, or the mop-fashion.

Davis says, however: "We certainly *know positively* that some of the races of South Africa, as the Hottentots and Bushmans, have hair growing in separate spiral tufts which have bare spots between, apparent to everybody." The excessive curliness of their hair depends on its peculiar conformation; it is very fine, and concentrically elliptic, or flattish, like that of the beard and pubes. Some of the Pacific races possess hair of exactly the same structure. The Chinese hair, and that of the North-American Indians, is cylindrical and straight.

An "experienced observer," a correspondent of Dr. Davis, says that the generality of natives in Fiji, and (he believes) in most islands to the westward, have hair clearly growing in tufts, with well-marked intervals. Their heads are remarkably long, narrow and high (hypsistenocephalism). Many of the young boys have hair thin, curly, tufted, and so distinct that they are little better than bare-headed. "The whole group of Gilbert or Kingsmill Islands, extending over six degrees of latitude, with one exception, is inhabited by straight, long-haired people. This exception is the north island, marked Pitt's Island on the Chart, the Taritari, or Makin, of the natives. The people of Taritari have the same language, manners, and customs, as those of the other islands in the group, but not straight hair. Strange to say, they have curly, "fuzzy" hair, growing in luxuriant abundance, and looking like a large black mop, but not a "thrum" mop.

"Every shape of color may be found in any island. The natives use lime, which turns the hair all shades, from light yellow, or tow-color, to brown red. Again, roots and barks of trees are largely used. . . . Without the use of any of these artificial aids, I think, all the nations of these waters, Papuans and Malayo-Polynesians, will be found to possess black hair only."

Wallace says of the typical Papuan race: "The hair is very peculiar, being harsh, dry, and frizzled, growing in little tufts, or curls, which in youth are very short and compact, but afterward grow out to a considerable length, forming the compact frizzled mop which is the Papuan's pride and glory. The face is adorned with a beard of the same frizzly nature as the hair of the head. The arms, legs, and breast, are also more or less clothed with hair of a similar nature.

9.—*On the Caves of Gibraltar in which Human Remains and Works of Art have been found.* GEORGE BUSK, in the Transactions of the International Congress of Prehistoric Archaeology, Session of August, 1868. (Quarterly Journal of Science, January, 1870.)

The rocky peninsula of Gibraltar is a detached promontory, composed principally of limestone, about three miles long and three quarters of a mile in its greatest width, and lies nearly due north and south. The lower portion of the western side spreads out so as to form an irregular sloping surface, here and there interrupted by longitudinal cliffs and ravines, upon the gentle declivities of which the principal part of the town of Gibraltar is built.

The eastern face, on the contrary, is a nearly perpendicular escarpment of limestone-rock, rising at different points to the heights of 1,250, 1,255, and 1,408 feet above the sea. The mass of the escarpment consists of a secondary limestone of jurassic age, much fissured, dislocated, and dipping to the west, but toward the southern extremity the beds become nearly vertical.

In no place in the world are caves more numerous within a similar compass than in the promontory of Gibraltar, which has, in fact, that account sometimes been termed the "Hill of Caves."

These caves are of two kinds: 1. *Littoral* or *sea-caves*, of which there are numerous examples all along the base of the eastern face as well as at several levels or terraces at various heights above the sea. 2. *Inland caves*, which do not exhibit the appearance of marine origin.

Many of both these classes of caves have yielded evidences of the existence of man, in the form of osseous remains associated with flint knives, flakes, stone axes, polished and chipped; worked bones, serving as skewers, arrow-heads, needles, and gouges; anklets or armlets of stone; hand-made pottery, querns, rubbing-stones, and charcoal. With these were found remains of numerous animals, including: *Rhinoceros tichorhinus* (extinct), *Rh. etruscus*; *Equus*, *Sus priscus* (ext.); *Sus scrofa*, *Cervus elaphus*, var. *barbarus*, *Cervus dama*, *Bos* (a large form), *Bos taurus*. Two forms of ibex, *Capra Algoceros*; and also the common goat, *Capra hircus*; *Lepus timidus*, *Lepus cuniculus*, *Mus ramus*. Of the carnivora were determined *Felis leopardus*, *F. pardina*, *Lynx serval*, *Hyæna brunnea*, *Canis vulpes*, *Urcus* sp.; remains of the common dolphin, numerous genera and species of birds, a species of tortoise, and numerous remains of fishes, of which the tunny is the most prominent.

The remains are embedded in red cave-earth, and also in a blue layer similar to that noticed in the caves of France and elsewhere. In many instances the organic remains have been carried down from one cavern to another at a lower level through long fissures, by heavy autumnal floods which pour from the higher grounds down to the Windmill Hill plateau (where many of these ossiferous caves are situated), bringing with them the remains of the various animals which in an earlier period inhabited the thickly-wooded heights, now entirely destitute of trees and only covered at places by the little *Chamae humilis*.

Many human and animal remains attributable to modern periods have also been met with; but the older human remains are distinguished by peculiarities in the thigh-bones, which closely resemble those met with in the Cro-Magnon Cave.

10.—*Proportions of the Body according to Races.* By Dr. WEISBACH, before the Paris Anthropological Society. (Anthropological Review, April, 1869.)

"The greatest propinquity with the conformation of the anthropoid apes indicating the most inferior degree of the human race, we must conclude that the race which possesses the largest amount of simian proportions in the greatest number of parts of the body must be the most inferior. Yet we feel embarrassed to give an answer; because in the small number of points upon which we can make a comparison between man and the orang, *the simian resemblance is in no wise exclusively concentrated in one race; but it divides itself, as to the different parts, among the different races, and this so effectually that there remains to each a lesser or greater share of this parental inheritance. Even we, Europeans, cannot pretend to have entirely severed ourselves from this parentage*; witness the shortness of our hand relatively to our arm, and, among the Slavons and Roumans, the great length of the forearm relatively to the arm.

"On examining the different races enumerated from this point, we see that none is completely deprived of dimensions of certain parts which bring it nearer to the type of the orang than the others. The Javanese and Madurians are favored, because they approach it by the smallest number of points. . . . whereas the Australian presents the most numerous simian similarities—in the length of the feet, the smallness of the legs, the broad nose and mouth, the elongated arm, the broad feet, and the thin calves."

11.—*On the Relative Proportions of the Superior and Inferior Limbs among the Negroes and the Europeans.* By BROCA, before the Paris Anthropological Society. (Anthropological Review, April, 1869.)

The following is M. Broca's summary of results:

"1. The length of the superior limb, compared to that of the inferior, is less in the Negro than in the European. In this the Negro is further from the simian type than the European.

"2. The length of the humerus compared with that of the femur, or with that of the inferior limb, is also less in the Negro, who, in this again, is more removed from the simian type than the European.

"3. The length of the humerus, compared to that of the radius, is much less in the black than in the white. This character brings the Negro nearer to the ape.

"4. The excess of length of the radius in the Negro, compared to the humerus, partly depends upon the shortness of the humerus, but not exclusively. The radius of the Negro is, in fact, longer than that of the white man, when it is compared with the inferior limb.

"5. The superior limb of the Negro, therefore, presents two opposite characters; for while, on the one hand, by the length of the radius, the Negro is nearer than the European to the simian type, he, on the other hand, is removed from it by the shortness of the humerus."

12.—*The Stone Age in Egypt.* The "Times," December 17, 1869. (Quoted in Anthropological Review.)

A letter has been addressed by Messrs. Hamy and Lenormant to

the Académie des Sciences, to prove that Egypt had its stone age as well as Europe. Their letter is dated from Luxor, and they write to the Secretary of the Academy: "We beg you to communicate to the members a discovery we have just made, in the course of a journey to Upper Egypt, undertaken under the auspices of the Khedive, which will not be devoid of interest to that learned body. The existence of an age of stone in Egypt has often been the subject of a controversy. The facts we are about to relate will, we think, give some information that will exercise an influence on the opinions entertained hitherto on that question. On the elevated plateau which divides the celebrated valley Biban-el-Molouk from the escarpments which overlook the Pharaonic edifices of Deir-el-Bahari, we have ascertained the presence of an enormous quantity of wrought flints, lying on the surface of the ground to the extent of upward of a hundred square yards. The wrought flints, which are of the well-known type designated arrow-heads, lance-heads, lanceolated axes, knives, scrapers, etc., evidently constitute the remains of an ancient manufactory, according to a probability prehistoric, and exactly resembling those known in France under the denomination of 'factory of the neolithic period.' M^r Ballard, Quatrefages, Wurtz, Jamin, Broca, Berthelot, with whom we had the good fortune to be travelling, were witnesses of the discovery, and authorize us to declare that they verify the origin of the specimens collected by us, and their similitude to those found in Europe. The best of them we propose to deposit in the Museum of St-Germain where they can be inspected by connoisseurs in antiquarian subjects."

13.—*On the Weapons and Military Character of the Race of the Mounds.* By Colonel CHARLES WHITTLESEY. (Memoirs of the Boston Society of Natural History, Vol. I., Part IV.)

The tools found in the Ohio mounds were, almost without exception, intended for peaceful purposes, indicating a people whose habits were not warlike. But, as the mounds could have been intended for nothing else than fortifications, it may be inferred that the weapons of their builders were made of wood, which has decayed and disappeared. A club, somewhat resembling a South-Sea Island war-club, was discovered in Ohio, many years since. It was of Nicaragua wood, and in good condition. There is some probability that it may have belonged to the mound-builders. A copper spear-head found near mounds in the vicinity of Cincinnati, is the only reported instance in Ohio of a weapon that might have been used in war.

Another remarkable fact is the absence of all signs of combat either in breaches in the walls or in hostile intrenchments. And there could have been no serious attack upon these fortifications without some trace of the assault being left upon the works. We have probably yet to discover their fighting-implements. Their stone axes may have served the purpose, but a people so highly advanced in mechanics must have had something better. Their copper knives, daggers, and spears, are not strong enough for the purposes of a lance or spear intended to stand the shock of armed men. Nothing resembling

word has been discovered. It is suggested that they may have used lints, in combination with wood, to make weapons like clubs.

Those who attribute these mounds to the present race of red-men forget that these tribes have never been known to erect any thing beyond wooden barricades or palisades for defensive purposes. Siege and defence are alike foreign to their habits and style of warfare.

In our Western States the order of progression from stone to bronze and to iron has been reversed; or, rather, the ancient inhabitants did not make progress, but relapsed.

14.—*On the Antiquity of Man in North America.* J. W. FOSTER, LL. D. (Transactions of the Chicago Academy of Sciences, Vol. I., Part II.)

The discovery of a human skull¹ in California, buried deep in the gold-drift and covered with five successive layers of lava, carries back the advent of man to a period more remote than any evidences thus far afforded by the stone implements in the drift of Abbeville and Amiens, in the valley of the Somme, or the human skeleton in the Loess of the Rhine. This skull was found in a shaft 150 feet deep, which passed through five beds of lava and volcanic tufa, and four deposits of auriferous gravel. The upper bed of tufa was homogeneous, and without any crack through which a skull could have been introduced from above. The age of these gravels is referred to the Pliocene, preceding the volcanic eruptions which cover a great part of the State—an age preceding the mastodon, the elephant, and other pachyderms. The glaciers of California were not a part of the great northern system, but descended from the Sierra Nevada.

A human pelvic bone, associated with bones of the megalonyx and mastodon, was found in the Loess at Natches. This formation may be regarded as contemporaneous with that of the valley of the Somme, in which the remains of *Elephas primigenius* are found.

A human skeleton found at New Orleans, sixteen feet below the level of the ground, has been estimated as 50,000 years old. Other observers, however, vary in their estimates of the age of the delta from 14,400 to 100,000 years.

The mound-builders, with their towns situated in the most desirable locations; their agriculture, their commerce with Lake Superior, and New England or Canada, as well as their vast mining operations; their copper and stone implements, their skill in the use of the loom, and in the plastic art; their elaborate fortifications and sepulchral mounds, belong to an epoch dating at least a thousand years back; and how much farther, cannot be affirmed.

Kitchen-middings are found at various points along the Atlantic and Gulf coasts. They are probably of quite modern origin.

The author enumerates nineteen species of animals belonging to the Terrace epoch, of which but one, *Cervus Virginianus*, survives. In the same period, in Europe, twenty-one species are enumerated, of which twelve survive.

¹ Said by Prof. Wyman to resemble skulls of the present Indians of California, and, in the points in which it differs from these, to approach the Esquimaux type.

III.

MISCELLANEOUS.

1.—*Life in Hot Springs, and Spontaneous Generation.* B. EDWARDS CLARK.

It is very seldom that the student of Nature at first perceives the entire relations of any new discovery in science, and is able to view it, in all its bearings, for the elucidation of other discoveries clearly understood. He investigates, and for the present content himself with recording the results of his observations, feeling sure that detached materials, which he thus accumulates, will sooner or later, either in his hands or in others, find their connection with facts already known, or render progress in new directions the more easy.

The discovery of life in hot or boiling springs is a contribution to the science of this nature. For a number of years Prof. Wyman, of this country, and several naturalists in Europe, have been studying the question of the origin or development of plant and animal life at the lowest forms.

They have taken various prepared fluids, containing organic material, and, after heating them to a temperature of 212° Fahr., have left them to stand, undisturbed, in hermetically-sealed flasks, for weeks and months; and have then, on opening the flasks, found that bacteria, and spirillia, have made their appearance.

The conclusion drawn by some is, that these are instances of spontaneous generation—of beings originating not from eggs or spores. All such, if present, are presumed to have been killed or destroyed by the high temperature to which the fluids were exposed, but from the material, which had been allowed to undergo decomposition. Assuming this to be true, we have discovered a third mode for the production of living forms. The two other methods have long been known, namely, from eggs, and by segmentation, or growth from the body.

But this important discovery rests on a single assumption, which has been much disputed, that all spores, eggs, and living forms are killed by being subjected to a temperature of boiling water; the consequence has been that many observations, made in regard to the existence of life in the various hot springs of the world, have been looked up, and new ones instituted, with a view of determining the highest degree of temperature which certain organic beings can endure.

It has long been known that in the Geysers of Iceland, and in various thermal springs of Europe, Asia, and South America, (which are free-moving microscopic forms) and other plants, of a ferrous nature, abound; but it is not till within a few years that thermal springs have been discovered in California in which both plants and animals are found. The naturalists connected with the geological survey of that State have contributed much information on this subject.

In 1866 Prof. Brewer, now of New Haven, described the

sers of California as consisting of steam vents and hot springs, having a temperature as high as 207° Fahr., in which low forms of vegetation, composed of simple cells, of bright-green color, occur, living where the temperature reaches even 206° Fahr. In parts of these springs, and in the streams running out from them, where the temperature ranges from 125° to 140° Fahr., "filamentous confervæ form considerable masses of a bright-green color."

Quite recently Prof. Wood, of Philadelphia, has published a similar account, given in a letter, of the Benton hot spring of California. In the basin of this, which has a temperature varying from 124° to 135° Fahr., are found the first forms of vegetation; and in the creeks running out, at a temperature of 110° up to 120° Fahr. "are algæ, some growing to a length of over two feet, and looking like bunches of waving hair of the most beautiful green. Below 100° Fahr. these plants cease to grow, and give place to a shining fungous growth." But the most interesting fact is, that Mrs. Partz, who writes this letter, and is known to be a trustworthy observer, "saw in the clear water of the basin a very sprightly spider-like creature running over the ground, where the water was 124° Fahr., and on another occasion dipped out two tiny red worms."

Adherent to the surface of these interesting plants, having the generic name *Nostoc*, were noticed numerous unicellular algæ, which are classed among the very lowest known organisms, being composed of simple cells, without nuclei, and multiplying, so far as known, only by cell-division.

It is thus clearly made out that there is an abundance of life in the various hot springs of the world, and that water at a temperature even as high as 200° Fahr. is not a hinderance to the growth of some organic forms. Now, as it is well known that the seeds and spores of plants can generally better withstand the extremes of temperature than the plants themselves, it has been held by many that some of these may possibly not be destroyed by the heat of boiling water.

Other experiments made by Prof. Wyman seem at first to confirm this opinion. By the aid of Papin's digester he heated the fluid contents of one hermetically-sealed flask up to a temperature of 150.52° Fahr., or about 38° above the boiling-point; and another similar flask he raised to a temperature of 307.5° Fahr., or about 95° above the boiling-point. In the first a film formed on the fourth day, and, when opened several days later, it was found to contain vibrios and bacteriums; in the record, which was examined on the forty-first day, monads and vibrios were discovered.

Prof. Wyman also subjected these beings, in great number, to temperatures varying from 125° to 150° Fahr., and found that none of them survived the treatment. He also repeated and added to many of the experiments made by others, in regard to the action of heat on eggs and spores, and came to the conclusion that all, so far as we know, are destroyed or killed by prolonged boiling.

Are we now justified in inferring that beings with motion were produced in the above experiments where life could not possibly have previously existed; in short, that these were instances of spontaneous

generation? In other trials, fluids containing organic materials were kept at the boiling-point for over five hours, and in these no living forms were subsequently developed. The conclusion to which we understand the professor to come is, that, though low forms of life and seeds and spores, are killed in a short time by a temperature of 212° Fahr. or less, organic material, not a part of an organism, must itself contain the principle of life, which is destroyed by boiling prolonged beyond five hours.

To us these experiments seem to prove that beings with motion are here developed, not from seeds or spores, but either from organic material, or from inorganic matter, the result of the decomposition of the former. The prolonged boiling may destroy the conditions favorable to the production of low forms from the inorganic matter present, which conditions may not be interfered with when the temperature is kept at 212° Fahr. only for a short time.

This is one of the applications of the results of the investigation in relation to the presence of animals and plants in hot springs: there is another, which carries us back to the earliest times—to the first geological periods, when life was, as it were, in its infancy, and the atmospheric, aquatic, and terrestrial conditions were quite different from those of the present day. The surface of the globe, the sea, and the air, the physicist tells us, had then a temperature considerably above that which they now have, and yet the fossil remains, belonging to those epochs, show unmistakably, not only that animals and plants existed in great variety, but that many of them were not unlike certain forms now living in temperate or arctic regions.

The knowledge of the life found in various thermal springs easily reconciles the naturalist to the views of the physicist, and he concludes that, with the cooling of the earth, the animal and vegetable world have in great part gradually adapted themselves to this change.

The abnormal forms and conditions of the present are often found by the scientific man to be full of significance, when connected with the past.

2. *On the Chinese Language.*—Difficult as the Chinese language is known to be, yet some may be inclined to conclude that the task of preaching the Gospel to the dense populations of this great empire is not, after all, so hopeless, since there is but one common language for all its peoples. Alas for the mistaken hope! There is one common language of books, but none for conversation or oral proclamation; there is one royal road for communicating through the Chinese to the Chinese mind, but for the ear we must follow each section of the nation, possessing its distinct dialect, and learn to speak that dialect before we can use the foolishness of preaching for the salvation of those who shall believe. The Chinese written language is one, and binds the far-stretching provinces together. The spoken dialects are more than two hundred in number, and vary so widely in many cases as to be in effect as formidable almost as varying languages, and so rare the speakers so strongly that they are to one another sometimes as foreigners, though still fellow-countrymen—all Chinese.

I have often experienced the effect of this twofold feature in the language of China—uniform to the eye, multiform to the ear—even in the comparatively limited range of my missionary itinerations in the province of Che-kiang. I have lain down to rest in the mission-boat at night amid the familiar sounds of the Ningpo dialect, or but a very slight variation of it, spoken by the passers to and fro on the banks of the canal; and in the morning I have waked up to find my boat threading its way through the crowded parts of a large city, all alive with market-people, and the shreds of their conversation which I could overhear scarcely intelligible from the variation of dialect. Yet here, over every shop, painted or cut on horizontal boards, or on signs swinging in the wind by the door, or painted again on the white-washed walls of streets and private houses, the same picturesque Chinese characters, with the sight of which I was familiar in Ningpo, entirely unchanged in form, conveyed the same meaning, and precisely the same idea, to the speakers of this different dialect. And still more striking was the impression produced by this peculiarity in the languages of China, when, on a tour for my health, I visited Fuh-chau and Amoy, or, last spring, on my return voyage, when I spent a few days in Hong-kong and Singapore. In these places the spoken language was absolutely unintelligible, not only to myself, but also to the ear of our Chinese Ningpo servant, who accompanied us; and yet their shop-signs, and bills and proclamations posted on the walls, spoke intelligibly to the eye, and spoke Chinese.

Analogies to these linguistic peculiarities will readily and naturally suggest themselves; but, nevertheless, no true analogy is, I believe, to be found. A deputation of the Church Missionary Society, after twelve hours' consecutive railway travelling, may find himself carried from the sounds of the Dorset dialect into the region of broad Yorkshire, and his ear may be perplexed both by the one and by the other; but when pleading the cause of the Society one Sunday before the Dorset peasantry, and the next before those of Yorkshire, if he speak in plain Saxon his sermon will be understood: he need not adopt the local dialect. The well-known Dorset poet, William Barnes, born and bred in the heart of the country, and who can move the laughter and tears of Dorsetshire men and women by his sweet pastoral poems in their dialect, as rector of a Dorset parish need use but plain English in his pulpit, and he is understood. Not so, alas! in China: there is no common spoken language, "understood of the people," in north and south of that great land. The dialects are languages, though with a common substratum, and there is no connecting medium of speech.

The Roman character, again, in its adaptation to most of the European languages (for there is an increasing tendency to print even German in such letters) may be supposed to correspond to the prevalence of the Chinese character throughout China proper, through its dependencies, and even in the adjacent empire of Japan (the Japanese, indeed, have a distinct language and orthography of their own). But the analogy in this case again does not hold good. German and French, Spanish and Italian, are indeed expressed in written and printed documents by exactly the same letters as English; and the

same individual letters in various combinations appear on foreign sign-boards and post-bills as on our own; but an Englishman is not, *on that account*, able to read and understand what he sees. The alphabet is not the language. In Chinese (to anticipate what must presently be described more minutely), there being no real alphabet, and every apparent letter and character being a complete word, those who can read the letters can read or understand the language, or, at all events (with the exception of lads in their first year of school-life), can give the meaning of the individual words, if not the whole drift of the sentence. In our alphabet of twenty-six letters, only three, *a*, *i*, and *o*, are words. In China, whose language is her alphabet, and whose alphabet, so called, consists of tens of thousands of what I will term for the time letters, each one is a word; and right spelling consists not in the right selection and order of the letters in the word, but in the right sequence of the strokes and dots (which are the only substitute for an alphabet) in the letter. The omission of a stroke or dot causes a distinct word to come into view; the omission of a letter in an English word does not necessarily destroy the character of the word so much as the reputation of the scribe. And, while speaking of the character, let me add a few words as to its history and mechanical nature: "The earliest plan for recording events or expressing thought where speech could not be used, was, it is said, the use of knotted cord. Then came a strange geometrical figure, eight-sided, invented by the remote Emperor Fu-hi as a means of recording, one can hardly say expressing, his views about the nature of things and of duty. Next came what was called the tadpole character, from the waving lines and thick head-like blots of which they are composed—probably picture-writing; and traces of these pictured ideas may be seen in the modern forms of the characters. These tadpole characters are still seen in very old inscriptions, but are never written now. Then followed the seal character, which is still used for seals, and for the titles for books, inscriptions on tombs and monuments, etc. Some scholarly gentlemen learn this character on purpose to be able to engrave seals, and present them to their friends; but many good scholars know nothing about it. About 2,000 years ago the *Li* and *Kiai* characters were invented by two officers in the court of Ts'in Sze-hwang, the first absolute Emperor of China. These characters are those now commonly used; while a somewhat stiffer style (the Sung character, invented about 1,000 years ago) is used sometimes in printing. Printing is done almost entirely by wooden blocks; and, the characters being cut out from the copy pasted on to the block, the style of the printed page depends of course very greatly on the style of the scribe's writing. In ordinary writing the full form of the character is hardly ever used, many well-known abbreviations being employed; and there is yet another style—the grass hand—in which abbreviation and fancy run wild, often puzzling even the practised eye of a Chinese scholar, and not merely the anxious eye of a missionary student. Such are the letters or characters with which we have to deal in China—invented in their earliest form, perhaps more than 3,000 years ago—for there is mention of a writing in the canon of history about 1270 a. c.—and

improved to their most perfect form 1,800 years ago, under the great *Han* dynasty, whose name is still given to the Chinese language and character. Writing is all done on paper made of the second skin of the bark of bamboo, soaked in water with lime till the woody and coarse parts are separated from the pulp. There is a kind of paper used in Fuh-chau called rice-paper, made from rice-straw; some also is made of cotton, some from the bark of mulberry-trees, wheat-straw, and from the skin inside cocoons. In very early times, smooth slips of bamboo were used instead of paper, and the characters were scratched on them with a stylus. Brushes of various sizes and qualities, such as those used by artists, are employed in writing, and no pens or pencils of a different kind are used by Chinese scribes. Medhurst thus enumerates the successive stages in the formation and in the nature of Chinese characters: first they were pictorial, then symbolic, afterward compounded, and finally arbitrary—a description correct enough if we bear in mind that traces of each of these stages still remain in the system of writing now in vogue."

Now, this double language forms the first and the life-long difficulty of a missionary to the Chinese. Without some degree of fluency in the spoken language, and some considerable familiarity with the language of books, no conscientious missionary will feel satisfied with the result of his studies, and with his mental equipment for his work. The colloquial is not beyond the reach of a diligent learner, with a quick ear and a ready memory; though to speak Chinese well is not the work of a few months, as some have asserted, nor even of a few years. The vocabulary is very large, the idiom intricate and peculiar: it teems with proverbial sayings; some with an historical and local reference; some with superstitious or religious allusions: some sayings or modes of expression are rife in the plains, some in the hills, of the same district; and I have more than once known a veteran and able missionary puzzled and surprised by phrases or words which I had happened to have not unfrequently heard, while he could perplex me by numerous expressions entirely strange to my memory and my ear. But the written language of China, to be mastered in its entirety, would require almost two lifetimes of unremitting toil; to be acquired as an ordinary Chinese scholar knows it, a missionary must give an amount of daily and life-long study which few, if any, can afford to bestow.

This being the case, it may well be deemed presumptuous in me, after only eight years' acquaintance with this ponderous and difficult language, to attempt to write upon it. I have thought it wiser and better, therefore, to give in what follows, almost *verbatim*, the results of the researches of one with longer experience than myself, merely adding a few illustrative remarks from my own observations. Let me make one remark, in passing, on a point of vital interest to all future students of languages in the mission-field. The importance of the first two years of study cannot be too often noticed nor too earnestly insisted upon. It is a time which, if once lost by negligence or by accident, never returns. I lost part of that precious time myself through the months of panic, confusion, and fighting, which immediately fol-

lowed my arrival in China; and I despair of ever thoroughly knowing the ground.

The materials from which what follows is drawn consist of an article in the *Cambridge Philological Journal* by the Rev. Moule, on the Chinese marks for the genitive and plural; of papers on the language, also by my brother, and read before my fellow-parishioners last year, from which I have already quoted above of a very brief paper on the same subject, which I shall quote *tenso*:

"When we speak of the Chinese language, it is important to remember that there are, in fact, two main branches of it, the language of books and that of conversation.

"This is the case in other countries; for instance, in English where it is hardly good taste in every-day conversation to talk as we write.

"But the difference is very much greater and more marked in China.

"In China there are a great many dialects of the spoken language perhaps as many as two or three hundred; while the book language is everywhere the same.

"The dialects differ among themselves as much as Dutch from German. Just as the educated Hollander speaks Dutch, a Saxon, German, so the man of letters at Ningpo speaks his Ningpo dialect, and the Shanghai scholar the dialect of Shanghai, with any reproach on account of provincialism.

"There is one of the spoken dialects called the Mandarin language, which is more generally understood by certain classes than the other. It is the native tongue, with slight local variations, of many of the provinces north and west of the river Yang-tze.

"The variety of it which prevails at Peking is called the 'Peking fashion,' and is adopted by all the mandarins and their *attachés* and servants throughout China.

"It is a political principle in China that no Mandarin may hold office in his own province. They are thus, so far as speech is concerned, foreigners wherever they go. Their common focus is Peking. The higher grades of mandarins have regular audiences and conferences with the emperor. They are thus obliged to learn his language—that of Peking—and carry it with them in their government throughout the empire. Hence it becomes naturally the official dialect of the Chinese courts of justice; not of the law-books, it is not of the pleadings, and evidences, and sentences. The witnesses coming into court, and speaking their provincial *patois*, are unintelligible to the mandarin until an interpreter explains in the official dialect. Written pleadings explain themselves to the judge's eyes, for his ear every thing provincial must be interpreted into the Peking fashion."

"So it was of old, when the barons held court and pronounced judgment for a Saxon population in Norman French.

"But it is wrong to call Mandarin the language of the 'educated'."

class.' Thousands of that class speak nothing but their own *patois*. In Ningpo, a city of 400,000 people, there are hundreds of literary graduates, but it is very hard to find one of them, not in official employment, skilled in the Mandarin colloquial.

"The great peculiarity, then, of Chinese, lies in the marked distinction between the language of books and that of conversation. For books, one language prevails from end to end of China, and is read besides by Koreans, Japanese, Loochewans, Annamese, Thibetans, Mongols, etc. For utterance, the dialects are legion; seven or eight principal varieties at least in each of the eighteen provinces.

"In learning a colloquial dialect—and very few missionaries ever attain the mastery of more than one—the pronunciation and the idioms of syntax are both serious difficulties.

"Many of the sounds are quite unknown, not only in England, but on the Continent too. For example, at Ningpo some of the commonest words commence with the nasal *ng*; *ngó*, 'I'; *ngco*, 'cow'; *ngan*, 'eye'; *ngao*, 'to bite'; etc. Some consist of *ng* without any vowel; as, e. g., the word for 'thou,' for 'five,' and for 'fish.' *M* again is sounded as a word without any vowel, or with a very indistinct vowel sound to help; and so are *s*, *ts*, *ts'*, *dz*, and *r*. The difference, too, between an aspirated letter and one without the aspirate is very important, and very hard to observe at first. *Tsá*, 'a debt,' must not be confounded with *Ts'á*, 'to send'; and *á*, 'low, dwarfish,' 'á', 'shoes,' *há*, 'crabs,' must be carefully distinguished.

"Missionaries must be more than careful not to clip an *h* in China.

"The tones are another very delicate and very important business. The Chinese distinguish two classes of tones, the even and the inflected.

"The inflected are the rising, departing, and entering tones. The first (at Ningpo) gently raises the voice while the syllable is uttering; the second pitches the voice high, and lets it drop slightly as the sound ceases; the third is short and abrupt.

"In some dialects all four tones, the even and the three inflected, admit an upper and a lower subdivision, grounded partly on the difference occasioned by the heavy or the light initial of the syllable. An educated Chinaman cannot always be trusted in the subdivisions of tone; but he never mistakes an even for an inflected tone, or *vice versa*.

"Nicety of ear and accurate utterance are indeed very valuable, but not indispensable; and some of our most efficient missionaries have been quite unable to master the tones.

"The confusion that would arise from such imperfections, and also from the monosyllabic nature of Chinese, and the small number (not 500) of distinct sounds in the language, is obviated chiefly by the practice of coupling each ambiguous word to another, which, by likeness or by contrast, seems to define its meaning.

"Thus at Ningpo, 'body' is *kyi-sing*; 'toil,' *sing-kw'u*; 'depth,' *sing-ts'in*; 'newness,' *sing-gyiu*. That is to say, four words, different in Chinese writing, but all sounded alike, *sing*, and which might be mistaken for each other if left by themselves, are distinguished and defined by being coupled to other words: to *kyi*, a word also referring

to the body, to *kw'u*, which means 'bitter,' to *ts'in*, which means 'shallow,' and to *gyiu*, which means 'old.'

"This practice of coupling, and the distinct arrangement of thoughts or matters in one's discourse, are the chief, though not only, means of guarding against confusion in our use of this monosyllabic, and, so far as different sounds are concerned, this poor language.

"For writing, all confusion is avoided, but, so to speak, by a costly device.

"This device is the Chinese written character.

"Every word, i. e., not only every distinct syllable, but each of many different meanings under each syllable, has a distinct written sign.

"Morison gives, under the one syllable *E*, not less than a thousand differently-written characters. And the instances just now given of the meanings of *sing* may also illustrate my meaning.

"These characters, or written signs, are not, like European words, spelled with one, two, or more letters of a definite alphabet. They are formed of strokes arranged, not so as to represent a sound, but serve as a memorandum or symbol of some definite notion or thing.

"Just as the numerals, 1, 2, 3, etc., or 100, 1,000, 2,000, etc., represent no invariable sounds, but only a particular numerical notion each; so that, while the Frenchman says *trois*, the Englishman says *three*, the German *drei*, and so forth, all of them, and a dozen other numbers besides, agree to think of the same number whenever the symbol is written.

"Of all our difficulties in Chinese, these characters suggest the most meaning, but having no invariable sound, are the chief.

"To read fluently the Chinese Bible or the Confucian books one must know 5,000 or 6,000 of them; some composed of fifteen or twenty strokes and dots, some again so nearly alike that it wants a practiced eye to distinguish them. As to the sounds of the written characters each dialect has its own way of pronouncing them: e. g., the sign 'ship' is *chw'an* at Peking; *zayn* at Shanghai; *jeune* (French) at Ningpo; *dzoan* at Hang-chow.

"The twofold nature of the language, for books and for talk; the quaint monosyllables that go to make up our talk; the tones and couplings with which we discriminate the syllables; last, and chief, the manifold written characters; these are some of the China missionary's difficulties.

"We thank God, however, that in many instances they have been overcome in great measure; and missionaries can both read and speak to Chinamen in their own tongue, and from the vertical columns of their own printed characters, the wonderful works of God.

"Old Prémare said well and truly, 'We must become boys again if we desire to preach Christ Jesus to these Gentiles so as to do good. But, with such a prospect, what toil will not be alleviated.'

Now, this paper, brief as it is, contains within it, or suggests, some of the points of chief importance, with reference to the Chinese language, and these points will require merely a few illustrative remarks.

I would notice, first, that neither the book language of the Chinese, nor the court or official mandarin dialect, correspond, as has been sometimes imagined, to the position and use of Latin as the means of communication between the learned in Europe. Latin, though a dead language as the language of a people, can yet be spoken as well as written. But, though the Chinese written language can be enunciated as well as written, it is never used as the medium for conversation; and though the mandarin colloquial can be written as well as spoken, it is the medium for official, not for learned converse; and the vast majority of the scholars of the empire know little or nothing about it. The mandarin dialect differs from the many other dialects of China mainly in the fact that it alone has a literature. Some few imperial works, the "Sacred Edict" for instance, as well as novels, have been published in this dialect; while the numerous local dialects of the provinces had no literature whatsoever until quite recently when Protestant missionaries tried the experiment. The New Testament, Genesis, Exodus, and some of the Psalms, the Prayer-book of the Church of England, a Hymn-book, "Pilgrim's Progress," together with a considerable variety of smaller books, are now printed, and are read by Christian converts in their own colloquial; but a Chinese scholar would rarely condescend to read a book in *patois*, though, as was stated above, he converses in the simplest *patois*.

Now, with reference to the spoken language, a few words on the tones must be added. Many contradictory statements may be met with on this subject. We find, for instance, in many books on China, ludicrous cases recounted of the effect of uttering a word in a wrong tone; and yet we were informed just above that many of our efficient missionaries have been quite unable to master the tones. Both of these statements are correct; neither, in effect, are they so contradictory as at first sight they would appear to be. When engaged in the translation of the baptismal offices, our missionaries discovered to their surprise that the Chinese scribe, writing from their dictation, had given in each place the character "book" instead of "water." The mistake arose through their faulty distinction of the tones. In the Ningpo dialect, though not in most others, "book" and "water" are words of the same sound differently toned, "book" being *shü*, and "water" *shü*. They had said *shü* (level), each time, instead of *shü* (mounting), and the scribe, who paid little heed to the sense, had consequently written "book." Yet one of these very missionaries, notwithstanding his continued inability to distinguish by ear and by enunciation the tones, has become, nevertheless, a fluent and effective speaker of the colloquial: and I am acquainted with a similar case in one of the southern provinces, where the tones are more numerous and more sharply marked, and hence more important than in the Ningpo colloquial; and yet the missionary to whom I refer, though unable to make a distinction of tone, is one of the ablest speakers of the dialect; both of these veterans having supplied this otherwise fatal deficiency by a very large and varied vocabulary, synonyme after synonyme removing all doubt from the minds of the hearers who might otherwise have been perplexed by wrong tones. The conclusion, therefore, is that too

great care cannot be bestowed upon the acquisition of the tones; while, on the other hand, physical inability to acquire these tones is not hastily be assumed to be an insuperable bar to efficiency. However, it is true, not a little of tone or accent which has a tonic effect in English, as, "*where* is the place where this was done?" "*who* being the same word and with the same meaning, but accented differently, because in the one case it asks a question, in the other it is relative.

Before I leave the subject of the spoken language, I must not fail to notice the importance of the classifiers in Chinese. We are without them in English, but their application is somewhat different and their number very much smaller than in Chinese. In English if I mistake not, no classifier is required for a living being or an inanimate object if in the singular number: *a* partridge, *a* sheep, *a* trooper, *a* soldier; in each of these singulars the indefinite article suffices; for two, or more than two, that we require classifiers: *a covey* of partridges, *a flock* of sheep, *a brace* or *a shoal* of trout, *a regiment* of soldiers. In Chinese, however, every thing, every object in Nature and art, with scarcely an exception, has a classifier; and the same classifier applies to singular and plural alike. The commonest, which is applied to men, hours, coins, and things, and which is sometimes loosely applied for some other objects, is pronounced *ko*, or in Ningpo *go*, and it means individual: *ih-go-nying*, "one individual man;" *jih-go-mu*, "ten individual men." But when speaking courteously and with respect of men, and especially of seniors, a new classifier is employed meaning a "throne" or "chair:" *cong-we hyüong-di*, "all you, honorable brethren," is literally "all the thrones of my brethren." Oxen and swine, and sometimes horses, are counted by head: *ih-ngo*, "one head cow;" or horses are reckoned by matches: *ih-p'ü*, "one match horse." Umbrellas, sedan-chairs, and caps, are told by summits: *ih-ting-gyiao-ts*, "one top sedan;" and the variety is altogether too great to enumerate. But if in English he would be reckoned an unpardonable ignoramus who should speak of a covey of soldiers, a shoal of ducks, a regiment of trout, or a flock of soldiers, more in Chinese is accuracy in the use of classifiers necessary. A missionary who would speak intelligibly and without provoking a smile.

There are some points applying equally to the spoken and written language which require a few words of elucidation. I proceed at once to notice the great peculiarity of both the spoken and written languages, namely, the absence of inflection. English is, of course, not so complete, and methodical, in this respect, as Greek, Latin, or German. To take a simple instance: when in Greek we have *δύο ἑσονται θύσαι ἐπὶ τὸ αὐτό*, the English rendering is "two women shall be grinding together," the participle grinding not being susceptible of inflection to mark the gender, and necessitating the insertion of the "women." In Chinese the sentence stands in the written language *yu dong mo*, "two women together grind," concise and brief and without the utter absence of inflections obliges the use of the word "women." In the Ningpo colloquial it is rendered *yu liang go*

nying bing-ba ky'in mo, where, *nyü-nying*, "women," is again inserted; and in either version the verb *mo* or *ky'in mo*, "to grind," is incapable of participial inflection. With us, even in our most irregular and eccentric language, nouns and pronouns have inflections to distinguish case and number, verbs are inflected to denote voice, tense, person, etc., and our adjectives are inflected to mark degrees of comparison. All of these inflections are unknown in Chinese, and their place is supplied by prepositions or auxiliary particles, or else the plain sense of the hearer is trusted to supply the meaning from the connection.

In the use of some of these particles a slight tendency to inflection is, so think some philologists, discernible; a tendency, that is, to a state in which they will cease to be distinct words, and remain as mere appendages to other words, marking case, number, or tense.

Drawing now to a close, let me briefly notice some of the more general and less minute characteristics of the language; points which should, perhaps, have been noticed at the outset, but which will nevertheless form, I trust, a not uninteresting summing up of the subject. Chinese is, as we saw just now, monosyllabic; these syllables are joined together in different combinations—pairs, threes, fours, fives; but are never either expanded into real polysyllables, or lost and dropped out of use as words themselves. Thus, "astronomy" is *t'ien-wen*, a double word, "heaven-science," not strictly a dissyllable. Now, when we are further informed that the list of such monosyllabic sounds is exceedingly small—in round numbers only five hundred—and yet that, in the great dictionaries of K'ang-hi there are forty thousand characters (Du Halde says there are in all eighty thousand), each character being the sign or hieroglyphic of a monosyllable, eager interest in the study of such a tongue will, I should hope, be excited, rather than amazed or amused incredulity. These five hundred primary sounds are increased by the variety of tone to some fifteen hundred; and then, for the vast wants of a language which shall express the philosophy, the aspirations, the technicalities, the love, the hate, the joy, the mourning, of four hundred millions of rational beings, the ingenious and picturesque, though cumbersome system of characters, expresses every shade of meaning to the eye; and the tones, the couplings, and combinations of these monosyllables supply the necessities of conversation.

One more peculiarity I must notice before I close.

The Chinese language has no relationship with any other tongue worth attending to. The language which was spoken in China in Abraham's day, two thousand years before England was known to civilized men, is spoken by the Chinese of whom English merchants buy their tea and silk, and to whom the missionaries of the Church Missionary Society carry the history of Adam, of Moses, and of Christ, the story of the Gospel, the precious word of God. It has been enlarged, it is true, during these four thousand years, from Yaou and Shun, the primeval emperors, down to the Manchoo family, which now sits on the throne. New wants and new thoughts have made necessary new words and phrases; writing and printing have suggested new and more complicated forms of expression; the pronunciation has been modified, and

a great variety of local dialects has sprung up. But all has been not by mixture of other ingredients, nor by taking in of Tartar or Malayan, or Sanscrit, or European, but by combining in various ways the native elements handed down from the very earliest settlers that first laid the foundation, soon after the dispersion of the kind from Babel, of the Chinese nation. How different is this of the language of China from the nature of our own language! It has been growing and changing for some two thousand years—the first Celtic element (a twig of the tree of languages, the main being the Sanscrit), through, and by means of, the Latin introduced by the Roman conquerors; then came the Danish and Saxon (the foundation of the English language); next Norman-French at the time of the Conquest; and after that, as commerce and learning drew Englishmen more into contact with foreign nations, the language was enlarged and enriched by fresh collections from the Latin, Greek, and other European tongues, by the languages of Arabia, Persia, and China, the Malayan, and the original languages of America. It is entirely the reverse in China. She has, indeed, lived aloof from other nations in a remarkable manner, but she has not been altogether without the intercourse which England has had with other people. She has been conquered by two, if not three, distinct races of Tartars, the Huns, Mongols, and Manchoes; the Chinese have fought and won against many more of the Tartar tribes, as well as the Arabs, the Persians of India, and the Malay peninsula and archipelago, the Japanese, the Loochewans; and among Europeans, with Russia, Holland, Spain, Portugal, France and England; yet no trace of the effect of the languages of either the conquerors, the tributaries, or the many acquaintances of China, can be discovered in her language. The Chinese language has triumphed over the Tartar languages of conquerors and allies, like Rome, in her fall subduing her barbarian invaders, no other tongue has been admitted to a domicile in China.

The unique and isolated character of her language may be explained in some measure at least, for the general misconception about its origin and composition. But surely no philologist will consider this a sufficient excuse for continued ignorance: rather should the mystery of its origin and history, and the difficulties connected with its nature and acquisition, give a keenness and a zest to its study. The powers of some of the noblest of human intellects have been devoted to the study of Greek and Latin. "They find in such classical studies," says a Frenchman (I quote the words of another), "first, two languages, each of them refined and exactness; each possessing an accident and admirably fitted to interest and exercise the faculties of invention and reasoning; and both complete in their history—embalmed in their perfect form. He deals also with two literatures, of preëminent grandeur and beauty, spread (taken together) over more than a thousand years, and, now, with their languages, fixed and embalmed in beautiful completeness, in their whole progress from youth to age." Such exactness of syntax, such beauty and sublimity—though Chinese is not devoid of elegance—such a mass of such treasures of knowledge, are not to be discovered in the

of China; but if it be "more blessed to give than to receive," here, in the study of this tongue, is a magnificent task for the noblest intellect; here is a field in which minds the best furnished with classical lore may exercise their powers; here is a task with which those to whom a classical education has been denied may grapple in God's strength, and welcome, as a higher calling, a grander pursuit. For what treasure of wit or wisdom, of tragic interest or tenderest pathos, drawn from the stores of classic literature, can for one moment compare in value and in glory with the Gospel of the grace of God, which, when we shall have learned Chinese, we may impart to that mighty nation, with her four hundred millions of human tongues, with her countless thinkers, readers, teachers, and scholars, passing on into eternity without hope, without God, perishing for lack of knowledge!

One word of practical appeal I would make in conclusion. If it be true that there are two hundred different dialects in China; if it be the case that it is very rare for a missionary to master more than one of these dialects; then, surely the theory with which, if I mistake not, some true friends of missions satisfy themselves, is a delusion. It will not do to send a few missionaries—a dozen or twenty at the most from our Church to that vast land—and exclaim that these men can introduce the leaven to leaven the lump; that a native ministry and a native church is the hope of China. We must have, to give the experiment a fair trial, leaven for the populations speaking each of these two hundred dialects; we must have two hundred and not twenty missionaries; or, if they shall go two and two, four hundred at the very least, before the Church of England can be at ease as to the performance of her duty to China.—(*Four Hundred Millions. Chapters on China and the Chinese. Rev. A. E. Moule.*)

3. *The Superstitions of the Chinese.*—The great majority of the superstitions of the Chinese are so intimately connected with their religions, that it may be asked why the present chapter did not immediately follow the first. My desire being, however, to awaken a deeper interest, if it may be, in the most vast and yet most neglected of mission-fields, the alternation of subjects will not be, I trust, without meaning. In my first chapter, by a view of the hopeless character of the three great systems which teach and awe, or attempt to satisfy four hundred millions of souls, I endeavored to excite such an interest. In the second, by the idea which I strove to give of the intricacies and the formidable difficulties connected with the Chinese language, it is possible that the earnest desire to go over and help the great Chinese nation may in some minds have been damped and discouraged. In the present chapter, therefore, my aim shall be to awaken afresh that interest by presenting the picture of the hopeless state of the heathen in China in a somewhat different light; or rather as shaded from the light of God's presence, by the intervention of ranges of superstition, as well as by the three great peaks of their religious systems; and I shall then hope, from one special instance, and from a comparison of mission-work in China, both with Apostolic labors, and with modern missions in other lands, to show encouraging proof, that, notwithstanding

the obstacles placed in the way of Christian missionaries by the religions, the superstitions, and the languages of China, yet their labor in the Lord has not been wholly in vain.

The superstitions of the Chinese are very intimately connected with the prospects of mercantile enterprise in China; and since we were informed, not long ago, that Christianity would do well to follow in the wake of commerce, and not by the enthusiasm or roguery of her emissaries to embitter the minds of the people against the religions and the wares alike of the West, it will not be without interest to hear that commerce, too, when leading the van, may very possibly come so violently into collision with Chinese superstition as to embitter the minds of the people against the wares as well as against the religions of the West. Not long since an attempt was made by an English engineer to establish a line of telegraph between the port of Shanghai and the anchorage of Woosung, a distance of about twelve miles. The posts were erected, but some of them were immediately pulled down by villagers. They were put up again, and a second time were found prostrate. An appeal was made through the consuls to the Chinese magistrates, who, after instituting an inquiry into the motives for this insult, reported that a man had died hard by one of the posts; that the neighbors asserted that he died in consequence of the dissipation or destruction of the luck of the village by the erection of these posts; that the fact of the man's death could not be denied, and the assertion of the villagers was not an improbable story; that vengeance on account of the death of the poor man would not be enforced, because of the unintentional nature of the injuries caused by the engineer; but that they, the magistrates, altogether declined to interfere and compel the people to leave the line of telegraph unmolested. It was therefore abandoned, and has not yet, I believe, been resumed. This ~~same~~ mighty superstition as to lucky influences, on which I must present ~~the~~ enlarge, would seem to have caused the failure, for a time at all events, of an American company which was formed to connect Peking with Hong-kong by an overland or submarine telegraph; and the same influence probably weighs strongly with the Chinese statesmen who opposed so thoroughly to the sanction of railways and mining operations through the plains and hills of the country.

There is another view of this subject, which more immediately affects the Christian missionary. As we believe that, just at the time of our Lord's first coming, the power of Satan and of his spiritual wickedness was especially virulent, showing itself, for instance, in demoniacal possession, so it may be that in China and in other heathen lands, which, as we trust, our Lord is now entering, the great enemy of souls uses and intensifies for his own purpose the old superstitions of the people. So that, whichever opinion is adopted, whether we believe with some that the way for the Gospel must first be cleared by civilization, by commerce, and by education, or whether we adopt the truer view, that Christianity is in itself a mighty civilizer, we shall find that the subject of Chinese superstitions is one of great and most serious import. I shall endeavor as far as possible to range the few specimens

with which I am acquainted, from among the great host of superstitious beliefs, under these two heads:

I. Superstitions intimately connected with religious observances.

II. Superstitions corresponding more closely to many which prevail in even Christianized and enlightened countries at the present day.

I. Influenced by some of their beliefs, the description of the Athenians in Acts xvii. may well be applied to the Chinese: they are "too superstitious," "*δεισιδαίμονέστεροι*," "much inclined to a reverence for unseen powers," as the word there rather means; a meaning which the word "superstitions" under my first head will be found rather to convey.

The system of ancestral worship, which I very briefly noticed in my review of the religions of China, combines very remarkably these two elements of religion and superstition. At the very root of the system lies, as a matter of course, the truth of the separate existence of the soul after death; for the worship of ancestors does not mean reverence merely for the memory of the departed, but rather the tending and the worship of the present though imperceptible soul. It took its origin probably from the primitive and purer love and care for the bodies of living relatives and the souls of the dead; purer, I say, for some beliefs and virtues surely were purer, higher up the stream of human life, nearer the fountain of primeval man; although, as the preacher tells us, those who imagine the former days as always better than the present, do not wisely inquire concerning this matter. Certain it is, that the original virtue of filial piety, which, though not in any way the soul of religion, is yet a mark of every religious man, has been turned almost into a vice by the accretion of numerous superstitious beliefs; the love, as we shall see, has been turned into fear, reverence into dread, and pure affection into provision for personal immunity from sickness and molestation.

The Chinese believe that every one has three souls. At the moment of death (which they call the breaking of the three inch breath, *sæn træng ky'i ih dôn*), one of these souls enters the unseen world and goes to judgment; one resides in the wooden tablet, the spirit's throne as it is called, which is erected to the memory of the departed either in some recess of the house or in the ancestral temple; and the third goes with the corpse into the grave. They believe that the unseen world is an exact counterpart, only spiritualized, of things visible; and that the spirits of the departed are in need of the same support as they required when living—food, raiment, dwelling-place—reduced, however, to a state suitable for the use of the invisible, which is attainable, they imagine, by the process of burning. There is a strange inconsistency in this superstition; for I have seen in Chinese coffins the corpse dressed in the usual costume of the living, each article of clothing being good and substantial, according to, and frequently beyond, the circumstances of the mourning family; a cap is placed on the head, the pipe is laid by the motionless hand, and frequently strings of hard cash are put in before the coffin-lid is screwed down. Whether this needless expense is incurred for display merely, or whether it is supposed that the

raiment, gradually decaying with the mouldering corpse, will become thus invisible and spiritualized, I am unable positively to determine.

The people are, however, too prudent to carry this extravagance to an excess. Having to provide, not on the day of the funeral alone, but henceforth in perpetuity for the comforts of the departed, and having to assist in the support not of one loved one alone, but of a long line of ancestors, stretching back with their shadowy forms into the mists of antiquity, the Chinese take care that clothing, furniture, and money, which must be burnt so as to be realized by the spirits, shall be as inexpensive as possible. They therefore manufacture imitations of these necessities in paper; the paper-money being covered with tin or gilt foil; and on some occasions a paper mansion, ready furnished and prepared, is burnt and passed entire into the unseen world. The food of the spirits is managed more simply still; the feast is spread hot and steaming: and this steam, with the fumes arising from the viands, forms the repast of the spirits; the substantial food, warmed up again probably, being consumed by the survivors.

The Chinese appear to believe, in common with the Greeks and Romans of old, that the spirits of those who have died and are unburied—those, for instance, who have perished at sea, or in battle, or in a foreign land—wander about in misery; just as, in this present world, those who have no home, no dwelling-place, wander about as beggars. There are ghost-beggars, say the Chinese, as well as sturdy, palpable, visible beggars. Now, the ranks of this unseen beggar-race are swollen by the spirits of those whose comforts are not attended to by their surviving relatives, or whose families have become extinct. And as in this world, the annoyance caused by troops of hungry mendicants is only too notorious, it is believed by the Chinese that the beggar-ghosts, though with tongues unheard, and hands unseen, and noiseless feet, do approach and annoy and grievously injure those who refuse a pittance of charity. Sudden sickness, and misfortune in the family or in business, are frequently attributed to the unwelcome visits of these beggar-spirits. Persons have even been known (so says Mr. Yates, of Shanghai, from whose able and interesting paper on these subjects much of what I am relating is drawn) to commit suicide, so as to be in a more advantageous position than they could attain in this world, to avenge themselves on their adversaries.

Now, in Chinese cities, the shopkeepers generally compound with the king of the beggars, for a certain yearly payment, in consideration of which they are guaranteed against the annoying visits of the beggar host. Hence it follows that, apart from the regular and orderly worship and culture of ancestors in each family, all those who value their peace and quiet, provide at certain periods for the wants of the untold crowd of wandering ghosts; and so tremendous is the power of this superstitious fear over the minds and pockets of the Chinese that, while real and present beggars are put off with the smallest possible sum, it is calculated that about thirty millions sterling are spent annually on this provision for the invisible host of imaginary mendicants. About half the women of China, some forty millions in number, are supposed to spend a large portion of their time in manufac-

turing the "*sh-boh*," or gold and silver paper for the dead. Hence also results the strong desire every Chinaman feels to have a son instead of a daughter; for, should the male line of his family fail, the ancestral feast cannot be performed, and then not only his own spirit will be starved, but all his ancestors will be reduced to a state of beggary. Christianity, by forbidding ancestral worship, breaks in the person of its converts the line of succession; and ruins (if Chinese superstition be other than superstitious) the credit of the family in the seen and unseen worlds alike, by consigning all to a condition of perpetual beggary. On one occasion (says Mr. Yates) a father, enraged even to despair at the resolution of his son to become a Christian, threatened to destroy himself: the son in that case would have been beheaded as the undoubted murderer of his father; and his spirit, appearing headless in the spirit-world, would have been greeted with insult and opprobrium there, as one whose guilt required no further evidence. The heads of pirates and other notorious criminals are suspended in cages, after execution, over the city gates and in other conspicuous places, as a warning and a deterrent, not merely through the prospect of punishment in this life, but also of indignity in the world to come.

Ancestral worship as an opponent of Christianity, so far as power and wide-spread influence are concerned, answers to the system of caste in India.

There is yet another phase of the superstition which must be noticed before I pass on to other branches of the subject. Since, according to Chinese ideas, the unseen world is a counterpart of things seen, and since the every-day observation of the people goes to prove that justice in China is altogether subordinate to covetousness, and that to gain one's cause you must bribe, the logical conclusion is, that the spirits of the departed are in sore need of money. It often happens that a rogue who has money, while on the way to the magistrate, will buy over the police who are dragging him along, and induce them for a consideration to connive at his escape. A well-dressed prisoner, again, is treated with far less indignity and cruelty than one in ragged clothing and with a disreputable exterior. Now, the spirit, so think the Chinese, immediately after its release from the body, is arrested by the police of the spirit-world. The sorrowing survivors set themselves, therefore, to provide for the wants of the departed; they supply clothes by burning, as I have described above; and vast quantities of paper money are contributed by the friends and relatives of the deceased, to enable him to corrupt his captors, and outbid all competitors in the courts of justice below; or if the worst comes to the worst, to furnish, at all events, his prison-cell with some little comfort and respectability. But something more serious than mere incarceration may happen to the soul. The Taoist and Buddhist priests who fatten on this, which in some senses may be termed a Confucian superstition, discover, while engaged in their devotions, that some ancestor spirit belonging to a rich family of their acquaintance is in a state of purgatory; casual information on this point reaches the ears of the family; they send for the priest, and consult him as to the necessary steps for the relief of their relative: the priest prescribes an elaborate

performance of the ceremony of the *kung tuh*, "meritorious service" and a large sum of money, part to be spent in the ceremonial, and the remainder to be the perquisite of the priests. The family, in great anxiety about their friend, and terrified at the same time at the threatened outlay, offer a lower figure, £100 say, instead of the price £200, and after a long haggling, the priest with much reluctance undertakes the attempt for £150. The service commences with sound of gong and amid the fumes of incense. Suddenly the abbot pauses and with feigned emotion announces that the position of the spirit is unchanged, and that for the sum offered by the family the work of release cannot be effected. They, roused now to anxious enthusiasm, raise or borrow, in some way, the extra £50, and the service is resumed; the spirit is struggling up the sides of the pit; one more effort, a little more money, and he will be free; and so the family goes on, frantic with eager expectation, "tear the bangles from their arms, tear the rings from their hands, and raising thus money from the pawn-broker pay an additional sum to the priests, the spirit is free, and their pie is rewarded with success." The release is, however, only temporary, and, when the family has recovered from the depression consequent on this great outlay, the priests will probably discover some other spirit in similar misery, or the same spirit, for some cause, shut up again in purgatory, and crying, "Have pity upon me, have pity upon me, O my friends!"

One might make merry over such a palpable invention of corrupt and covetous priests; one might compare it with that which it most strikingly resembles, the Roman Catholic superstitions: but it is subject too sad for laughter, too terrible in its power and wide-spread influence for mere philosophical analysis or mere amused comparison with sister follies.

But before finally leaving this branch of my subject, I must notice another superstition. The priests are not the only mediums between the two worlds. Witches abound in China, and they are very generally consulted by the friends of the departed as to the condition and circumstances of the spirits in the other world. I have seen a good deal of these witches during my residence in China; and, amid the great preponderance of deliberate imposture, I am inclined to believe that there is much in their practices and pretensions which bears strong resemblance to the account of the Jewish witches in the Bible. One of these women came to my house two years ago with her husband, who was for some weeks possessed as well as his wife. She treated me to allow her to spend the night somewhere on the premises. She assured me that it was not all imposture in her case, although admitting that she did much simply for the sake of gain. "But it is a disease," she said; "I cannot help it; and, if only I may spend the night here, the spirits will not venture to molest me." Occasionally blind young men practised witchcraft; and I once watched such a one in a village among the hills, swaying to and fro under the spirit's influence, the mother and friends of the dead sitting before the young man in awe, and with the most intense interest written on their countenances, while he uttered the communication of the spirit he had called up.

The people dread the evil eye and the mysterious influence of these witches exceedingly; and this superstitious dread acts as a powerful opponent to Christianity. On two occasions I have known favorable impressions, and a rising interest in Christianity entirely dissipated and destroyed by the lying stories of the witches. In the one case an old Christian widow, in the other an aged Christian farmer, having died tranquilly, and with the bright hope of immortality, having also on their death-beds warned their relatives not to forsake the Christian Church, we had good hope that the influence of the departed saints would abide in force. After a few days, however, a witch reported that the spirits of these Christians had appeared, bemoaning their misery, for they were shut out, because of their apostasy, from the front door and back door of the temple of their ancestors, and entreating, therefore, their surviving relatives to abandon so ruinous a religion. The effect was instantaneous; and most of them left us, and have never returned. Witchcraft is, however, treated as worse than a mere superstition in Chinese law, and according to the statute-book is punishable with death.

Magical arts, and the communication between the two worlds, are not, however, confined to the Taoist or Buddhist priests, to witches, or to the blind; there is a class of so-called scholars who make exorcism, divining, fortune-telling, and, above all, the determination of good and evil, *fung shuy*, or geomancy—that great superstition to which I must now turn—their chief occupation. The two words, *fung shuy*, mean wind and water, but the true sense and import of this name for the superstition cannot be gathered from these words. The Chinese seem to believe not only in the existence and active agency of disembodied spirits, but also in the power to bless or curse possessed by an invisible influence or agency; and to woo the good, and ward off the bad, is the object of the study and profession of *fung shuy*.

“Fair weather cometh out of the north,” said Elihu to Job; or “gold,” as it is given in the margin; the golden gleams of sunlight, breaking through the thick clouds which have been broken and scattered by the springing up of a north wind. Matthew Henry seems to imagine, from this verse, that the wind which sprang up and dispersed that thickest of all clouds which have veiled the face of the earth, the flood-cloud, was a northerly wind. Be this as it may, we all know that here in England, as well as in Judea, a long and dreary rain, like Job’s misery, is turned into gleams of sunlight and blue sky by the shifting of the wind to the north. But it is withal a cold quarter. North and northeast winds blow in China from October till the end of March, and they are associated in the minds of the people with the death of Nature, the fall of the leaf, the fallow fields, with shivering bodies, cold feet, cold hands, and all that makes the earth dreary and the person suffering. Hence all evil influence is supposed to come from the north. When, however, in April, the softer airs from the southeast and south set in, the earth begins to stir, the flowers awake from their winter sleep, the trees put on fresh green clothing, the birds, silent when the north wind blew, sing for joy, and the animal creation generally feels the genial influence from the south, an influence which

had been chilled and suspended through the long winter months. Therefore, conclude the Chinese, all good and beneficial influence comes from the south. They care not for the foolish and selfish prejudice of the missionary and merchant, who hail the first blasts from the north as the sound of deliverance from the prostration and the diseases caused by the heat of a Chinese summer. They take a wider and more philosophical view; they see earth and her myriad inhabitants all alive and vigorous under the breath of the south wind; they feel the glow of the lengthening warming days; they feel sure of the correctness of their theory, and they extend the action of this theory to the dead—the unseen world—as well as to this visible earth. The dead, too, are affected by points of the compass; and both the living and the dead must be protected from the baneful northerly spirit, and must welcome and secure by any means the influence from the south.

It is strange that the same superstition prevails, I believe, in not a few country villages in England. I know one village in Somersetshire, where none but suicides are ever buried on the north side of the church. Either there are relics of heathenism in Christian England, or this superstition of the Chinese is not altogether heathenish. Certain it is, however, that the power and deep-rooted influence of the belief cannot be exaggerated. One is not surprised to find all the temples and houses which can possibly be so erected, built to face the south; because both priests and people may thus sit at their doors and enjoy the summer breeze, be sheltered from the blasts of winter, and, enjoy the warmth of the southerly-glancing sun, whenever he will look forth through the clouds and snow of the cold season.

But it is in the selection of sites for graves that the talent of the professors of *fung shuy*, called, in Ningpo, *nyien-bun sin-sang*, is chiefly displayed. "A thoroughly good situation must then be open to the south, with nothing abruptly to check the flow of the southerly blessing: and to the north there must be some hill or rising ground, some tree or other object, to check, puzzle, and defeat the flow of evil from that withering region. And just as the roots of the apparently dead trees and plants feel and respond to the breath and the call of the airs in spring-time, so are the buried dead supposed to feel the influence of good *fung shuy*, an influence which arises from the root—the departed ancestors—into the living boughs and branches of the family who have shown their loving care for the dead, by selecting the clever magician, who has in his turn chosen so well the place of repose. But if the position be bad, the dead, irritated and annoyed by the unpleasant influence from the north, make known their resentment by causing sickness and other calamities to assail the family; and finally, if the mischief is not repaired, they make it wither away. As the village has its *fung shuy*, its luck, and the hand of the man who would cut down a lucky tree, thus letting in a stream of curses from the north, is said to be paralyzed and wither on the spot."

I have put this superstition on its trial. Three winters ago, being unable from press of work to take my usual Christmas-eve walk in the country, to cut holly, I requested one of my catechists, on his way to Ningpo, to cut some boughs from a tree which I had marked, and

whose position I described to him. He reached the tree and set to work, when out ran the people from the neighboring houses, shouting and threatening: "*You destroy our tree; don't you know it's the luck of the place (the fung shuy)!*" My good friend, being of ready speech, answered them quietly, and by a clever question or two gained their attention, went on cutting the boughs, while he preached them a sermon, and finally brought the holly up in triumph to me. During the occupation of the city of Ningpo by the T'aping rebels in 1862, the late Captain Roderick Dew, who was in command of the squadron then lying in the river, caused a canal to be cut through a narrow neck of land lying northeast of the foreign settlement, whereby two bends of the river Yung were joined, and the exposed peninsula converted into a defensible island. During those sad and troublous days, even Chinamen forgot *fung shuy*, and the rich merchants gladly subscribed toward the expenses of the work; but, since that time, the trade of the place having greatly declined, the discovery has been made that the canal destroyed the luck of Kong-poh, and this useful and important work will not improbably be filled in and destroyed, through the power of a senseless superstition. It is an interesting fact that this superstition of *fung shuy* is denounced in the Emperor Yung-Cheng's sacred edict as a capital crime.

Chinese villages are generally built in squares, with houses on three sides, and the entrance open toward the south. The two sides as you enter have different degrees of honor and importance; the right hand is the green dragon, the left the white tiger; and if, by design or accident, the white tiger's head be lifted higher than his opposite brother, the dragon's, or if any special advantage be gained by the left, then the luck of the place is gone. I was obliged on one occasion to suspend repairs on the church-premises in one of our out-stations, because, unfortunately, the Christian church was lodged in the white tiger's region, and the door which I wished to open toward the south would have given to the tiger an undue preponderance of advantage over the dragon. Our chief mission-church in Ningpo is built on the left hand as you enter a lane turning out of a main street; on the right of the lane stands the house of a rich man; our church has a high-pitched roof and a bell-turret; and the people affirm that since the building of this church, overtopping the mansion, the fortunes of the rich man have steadily declined.

II. But it is time for me to turn to those superstitions which more closely resemble such as prevail in the enlightened West. I might enumerate a great many under this head: but, lest I become wearisome, I will mention only two. Mr. Home would be interested, and perhaps surprised, to hear that the principle, at all events, of table-turning is known to the Chinese, and has been known probably for centuries. Begging Mr. Home's pardon, I suspect also that, coupled with some features which are not easily explained away, there is yet about as much imagination and imposture in the Chinese as in the English phase of the superstition. The idea is the same; the unseen spirits converse through some medium, and this medium uses some substantial and tangible object wherewith to enunciate the oracle. The

plan the Chinese adopt is to strew a table with flour or sand, and either to suspend a writing-pencil so that the point may just touch the table, or to fix it in the rim of an inverted wicker rice-basket, which must be balanced on the fingers of two persons sitting opposite to each other. In either case, after quiet waiting, the pencil will begin to move, and will answer any questions which may be put, by writing on the sanded table.

The Rev. R. H. Cobbold, formerly Archdeacon of Ningpo, and who has kindly given me the result of his own investigations on these points, tells me that on one occasion his teacher consulted the oracle for the purpose of filling up some names in the ancestral register which were wanting. On asking for a particular name, the oracle wrote, "Inquire of another branch of the family;" and on doing so the spirit at once wrote down the name. Now, the difficulty of denouncing this superstition as pure imposture arises from the apparent impossibility of writing intricate Chinese characters with a pen suspended by a string, simply through the muscular energy caused by the united will of the two mediums. So great is the mystery, or, if you please, so clever is the trick, that some of the oldest and most wide-awake of the missionaries had been quite unable to explain it away, even when performed under their own eye and on their own study-tables. This mysterious art goes by the name of *p'i-kyi*, meaning, I suppose, explanatory record.

The Chinese believe in *ghosts*; and the following is an account given to me by a Chinaman last year, of a ghost which he had himself seen: He was returning from Hang-chow in one of the large passenger-boats carrying from twenty to thirty persons, and propelled by two sculls at the stern, and with four men tracking on the bank. One evening, with a low moon dimly shining through the mist, the towmen on the bank shouted loudly to the passengers. They stood up in the boat, and saw, about thirty yards beyond the foremost tracker, a figure as of a man; they called, and there was no answer; they ran, and the ghost ran; they stood, and it stood. While intently watching, it turned and plunged into the stream, but no ripple marked the water's surface and there was no noise nor splash as it entered. It swam over the canal, scrambled out on the other side, and my informant himself saw it disappearing in the mist as it moved away into the country. There are no monkeys nor bears in that district, and I freely confess that though I laughed when my old friend related the story, I cannot yet satisfactorily account for the phenomenon described to me with great minuteness and all seriousness. The mention of monkeys reminds me of a curious superstition which prevails in Java and in China, answering, in a measure, to the English superstition of nailing horseshoes over stables and barn-doors. The meaning of the latter custom I cannot accurately narrate, but the Chinese custom with its origin are not without interest. They very generally keep one or more monkeys in their horse-stables, evidently as a charm, and a preservative against disease and accident to the steeds. The origin of this custom is narrated in the number for April, 1868, of a very interesting publication, "Notes and Queries on China and Japan." It appears that about 1,500 years

ago, the horse of a celebrated general suddenly dropped dead. A man named Kwolp'oh happened to be calling on the general, and he said: "Send twenty or thirty vigorous fellows armed with bamboos into the woods thirty miles off, which surround the temple of the gods of the land and grain. Let them beat the cover, and they will catch a thing, which they must bring back, and your horse will live again." The fellows were sent, and caught this thing, which resembled a monkey. When it came near the dead horse, it blew its breath into the horse's nostrils, which suddenly arose, and ran as fleetly as before; but the monkey disappeared. The Chinese and Javanese to this day, without knowing this story, cling to the custom which took its superstitious rise from the superstitious tale.

These superstitions, if they show nothing else, prove undoubtedly that the Chinese are very *human*; their very superstitious beliefs and customs tell us that they are made of the same blood with their brethren in the West; and thus I would fain hope that the very follies which I have been narrating may draw out our brotherly sympathy toward that mighty but enslaved nation.

And the whole subject suggests to my own mind a closing thought.

When, after listening to stories which touch on the mysterious intercommunication between the seen and unseen worlds, a feeling of awe comes over the mind, I have felt that the one blessed cure for the dread of the presence of the unseen spirits is the presence and love of the unseen but ever-near Redeemer. His voice speaking, though the world hears not, to the heart; His Holy Spirit, comforting and calming the soul, can give courage to the coward, and strength to the weakest, can disperse all superstitions and all substantial fears, and

"Make even the darkness of the tomb
A smile of glory wear."

This is what China needs. The dim twilight of her moral systems, the darkness of her idolatries, the midnight gloom peopled with the ghosts of her superstitions, need the light of the Gospel, the glad tidings of a justifying and atoning Redeemer, the influence of the Lord and Giver of life, the presence, yet unseen, of the Saviour, like the dawn of a summer day before the sun mounts above the horizon; and we may help to scatter the darkness, and to spread the glorious light, till the Sun of Righteousness appears, the day breaks, and the shadows flee away.—*From Four Hundred Millions. Chapters on China and the Chinese.* By Rev. A. E. Moule.

4. *A New Magneto-Electric Machine.*—Many ingenious contrivances have been used for the production of electric currents from permanent magnets. The general principle of the construction and action of such apparatus is as follows:

A bar of soft iron is made to revolve with great rapidity in front of, or between, the poles of a permanent magnet or magnets. On the bar of iron, or revolving armature, is wound a quantity of fine copper wire, insulated with a covering of silk. Motion is communicated to the armature by some arrangement of multiplying wheels. Every time

the direction of the armature is changed relatively to the poles of the permanent magnet, an induced electric current is generated in the coil of insulated wire surrounding it, the current being reversed in its direction twice in the course of each single revolution of the armature. The reason of this reversal will be understood when the cause of the production of the electric current is more fully explained.



Faraday demonstrated the production of an induced electric current by the action of a permanent magnet by the following beautifully simple experiment. A coil of insulated copper ribbon, about forty feet long, was wound in a single flat coil, like a chronometer spring, round a soft iron rod. The end of the ribbon was drawn out of the centre of the coil, and soldered to a small plate of copper, stouter than the ribbon. One surface of this plate was amalgamated with mercury. The outer end of the ribbon was pointed and bent in the form of letter S, so as to act as a spring, and rest lightly on the amalgamated plate. The iron rod on which the coil was wound was placed on the poles of a powerful permanent magnet, supported in a vertical position. Thus placed, the rod became itself a magnet by induction, and generated an induced current in the coil of insulated copper ribbon wound upon it. Induced currents, being instantaneous, are only present at the moment of making and breaking contact between the bar and the magnet. When the contact was broken with a sudden jerk, the spring end of the ribbon flew up from off the amalgamated copper plate, which it rested, and deflagrated a portion of the mercury, producing a small, bright spark. On reversing the ends of the bar relatively, it becomes an induced magnet with its poles reversed, and the current induced, in the ribbon will run in the contrary direction. If, instead of fifty feet of copper ribbon, we wind fifty yards of fine insulated wire upon the iron rod, and attach the rod by its centre to an axis at right angles to itself, as well as to the poles of the permanent magnet, and bringing the two opposite ends of the fine wire into contact, by means of springs with two separate pieces of metal, upon touching both pieces of metal while the axis is rotating, a strong electric current will be formed.

Machines of this kind, as usually made, are only powerful enough to produce physiological effects. Those which have been made for

erful enough to exhibit effects similar to voltaic batteries or plate-glass electrical machines have been so cumbersome and expensive as to preclude their coming into general use.

Mr. Browning, of the Minorics, has just introduced a magneto machine of novel form and arrangement, in which the disadvantages of the old machines have been completely removed.

In the engraving, A A are two prominent magnets, of a similar form, whose poles at the lower part nearly approach, and actually face each other. B is an armature of soft iron, round which a quantity of insulated copper wire is wound lengthwise. The armature is made to revolve with great rapidity by the following ingenious arrangement: The handle in front of the instrument communicates motion to the cog-wheels at C, which are a modification of Watt's celebrated sun-and-planet-motion. The wheel D moves with the cog-wheels, and being attached to a hollow arbor through which the spindle passes, to which the handle is attached, it makes six revolutions for one turn of the handle. The rim of the wheel D gives a multiplied motion to the armature B, which is thus caused to revolve nearly thirty times for every time the handle makes one revolution.

The ends of the insulated wire on the armature are connected with the two brass balls in which the wires marked E are fixed. A commutator, which cannot be seen in the engraving because it is behind B, controls the connection, in such a manner that all the positive currents are sent to one ball, and all the negative to the other.

Two armatures are supplied with each machine, one containing a few yards of insulated wire of large size. This is known as the quantity-armature. The other armature contains a great length of exceedingly fine insulated wire. This is the intensity-armature. The quantity-armature produces effects similar to those produced by a voltaic battery; the intensity-armature such results as are obtained by means of an electrical machine.

With the quantity-armature the following effects can be produced: Half an inch of platinum wire, placed between the poles at E, can be made white hot in a few seconds. An induction-coil may be made to give off bright sparks, or illuminate small induction-tubes. Bells may be rung, or telegraphs worked, even at a distance of many miles. Water or chemical salts may be decomposed.

With the intensity-armature, Abel's fuses may be fired, and most powerful physiological effects may be produced. The power of the shock-current may, however, be modified to any extent at the will of the operator, so that it may be made quite unbearably, or scarcely perceptible, as desired.

The decomposition of metallic salts under the microscope is a singularly beautiful experiment. It is only necessary to place a small quantity of a metallic salt, such as sulphate of copper, nitrate of silver, or acetate of lead or zinc, in solution, in a hollow glass cell on the stage of the microscope; then bring the ends of the wires from the machine, and dip them into the liquid. Upon turning the handle of the machine, the salt will be decomposed, and the metal will be deposited in the form of crystals upon the end of the wire forming the negative pole.

If the current from the quantity-armature be sent through a coil of stout insulated wire, wound round a rod of soft iron, bent the shape of a horseshoe, the iron becomes a magnet, and will support weight attached to its feeder. Here we see the permanent magnets of the magnets make the revolving armature an induced magnet. Interruptions in the magnetism of the armature, caused by its rotation, induce a current of electricity in the wire wound upon it. The passage of this electric current through the coil of wire on the iron horseshoe converts the iron bar into an induced magnet.

The machine we have described moves with very little friction, is very compact and portable, and is comparatively inexpensive, less than one-third the price of the old machines of equal power. With the intensity-armature a most powerful and intense current is produced. The current is completely under control, and as we said, can be modified at pleasure, so as to be applicable for many uses. By an ingenious arrangement of the commutator, the current is made to flow continuously in one direction. Dr. Richardson, F.R.S., so well known for his most valuable method of using ether-sprays for the purpose of producing insensibility to pain, instead of administering chloroform to patients about to undergo surgical operations, states that he has used this magneto machine with great success.

For any purpose, the effects of a moderately powerful voltaic battery may be produced, without the trouble and inconvenience attending the use of batteries. The instrument is elegant in appearance and always ready for instant use.—*Student and Intellectual Observer*.

5.—*Physics and Metaphysics.* By Prof. JOHN TYNDALL. ("Scientific Uses of the Imagination.")

A work recently published by Mr. Murray contains a sketch of the grounds on which the most advanced scientific thinkers of the present day base their convictions as to the physical character of light and heat. The fundamental idea there developed is, that the phenomena of light and heat, like those of sound, are essentially "mechanical." Precisely the same reasoning applies to the vibrating ether which produces the one as to the vibrating air which produces the other. Both are dealt with substantially as we should deal with the waves of a liquid or the swing of a pendulum. Reflection on this subject suggested the thought that the considerations brought forward in the sketch referred to may apply themselves to certain phenomena which are usually considered to lie outside the pale of physics, and that they indicate new relationships between man, regarded as a being of intellect and emotion, and the wondrous material system in the midst of which he dwells.

All our intercourse with the external world consists exclusively of an interchange of motion. From a vibrating, sonorous body, for example, pulses are sent to the ear, and stir the auditory nerve to motion. From a luminous body pulses are sent to the eye, and stir the optic nerve to motion. Other pulses of different periods strike upon the nerves, and produce the sensation of heat; but, in all cases, whether the stimulus be light, or sound, or ordinary feeling, the excitement of the

regarded more strictly, is the excitement of motion. And, if the motion be induced by internal causes instead of external, is it not fair to infer that the effect on consciousness will be the same? Let any nerve, for example, be thrown by morbid action into the precise state of motion which would be communicated to it by the pulses of a heated body, surely that nerve will declare itself hot—the mind will accept the subjective intimation exactly as if it were objective. The retina, as is well known, may be excited by purely mechanical means. A blow on the eye will cause a luminous flash, and the mere pressure of the finger on the external ball will produce a star of light, which Newton compared to the circles on a peacock's tail. Disease makes people see visions and dream dreams; but, in all such cases, could we examine the organs implicated, we should, on philosophical grounds, expect to find them in that precise molecular condition which the real objects, if present, would superinduce.

The color of light is determined by the frequency of the ethereal vibrations, as the pitch of sound is determined by the frequency of the aerial ones. The red or purple, for example, of a British maiden's cheek and lips, the blue, violet, or brown of her eyes, have their strict physical equivalents in the lengths of the waves which issue from them; and these waves are not only as truly mechanical as the waves of the sea, but they are capable of having their mechanical value expressed in numbers. In the work already referred to, a chapter is devoted to the relation which subsists between light and heat and mere mechanical work. In virtue of this relation we can tell the precise amount of work which a given amount of sunshine can perform. Now, the hue of the cheek is caused by the extinction of certain of the solar rays by the coloring matter of the cheek, the residual color being that seen. Could we interpose the substance to which some English cheeks owe their bloom in the path of a beam passing through a prism, we should probably find the orange and yellow and green of the prismatic spectrum more or less absorbed, the red and a portion of the blue being transmitted. This would give us a purplish blush resembling that of the permanganate of potash, commonly called the mineral chameleon, a solution of which acts upon the spectrum in the manner just described. Inasmuch, then, as we can calculate with perfect exactness the mechanical value of the total light which falls upon the epidermis, a certain fraction of this will express the mechanical value of the cheek's color. We do not, therefore, jest, but speak the words of truth and soberness when we affirm that the rays to which the tinting of any given cheek is due would, if mechanically applied, be competent to move a wheelbarrow through a certain space, or to lift a scuttle of coals to a certain calculable elevation.

But the human face and eyes flush at times with a radiance which might well be taken for a direct spiritual emanation entirely independent of "brute matter." Let us examine this point a little. Musical instruments, and also the human voice, have a peculiarity as regards their sounds which differs from mere pitch. A clarinet and a violin, for example, may be both pitched to the same note, but a listener who uses neither can at once tell that the "qualities" of the notes are dif-

ferent. This difference is what the French call *timbre*, and the Germans, we believe, *Klang*. So, also, we can distinguish one vowel from another, though all may have the same pitch. The difference here according to the recent investigations of Helmholtz, is due to the fact that certain incidental notes commingle in each case with the principal one, and produce a composite result. The "harmonics" of a string are known to be due to minor vibrations which superpose themselves upon the principal ones, as small ripples cover parasitically the surface of large sea-waves. The notes of the true simple wave and of its parasites are heard at once, and it is the variation of the latter which produces differences in the *timbre* of a musical instrument or of the human voice.

In speculating on those more subtle phases of expression to which we have above referred, might we not offer the conjecture that they are not due to those waves alone which make the eyes violet or give the cheek its rose, but are a result produced by the compounding of these with incidental waves, which influence the color as the harmonic waves of sound influence the pure quality of a note? We have often watched with deep interest and sympathy the countenances of some of the praying women in the churches of the Continent. We have seen a penitent kneeling at a distance from the shrine of the Virgin as if afraid to come nearer. Suddenly a glow has overspread her countenance, strengthening in radiance, till at length her very soul seems shining through her features. Sure of her acceptance, she has confidently advanced, fallen prostrate immediately in front of the image, and remained there for a time in silent ecstasy. We have watched the ebbing of the spiritual tide, and remarked the felicitous repose which it left behind. At each new phase of emotion the *timbre* of this woman's countenance changed, and—

"The music breathing from her face"

became altered in quality.

The tendency of the above remarks is to show that the most subtle phases of "expression" have at least a proximate mechanical origin. The splendors of the "imperial Eléanore," the "languors of her low deep eyes" are all reducible to the same cause; and not only so, but they actually exist for a time in space, isolated alike from her and her worshipper. Every gleam of those eyes, every flush of her brow, every motion of her lips, requires the ether for its transmission, and certain calculable time to pass from her to him. During this time the expression which is to stir the soul, to kindle love or quench it, exists in space as a purely mechanical affection of matter; and, ought we know, a slight steepness in the front of an ethereal billow, a slight curl of its crest, or some other accident of form, may determine whether the recipient of its shock is to be elated with joy or steeped in misery.

The philosophy of the future will assuredly take more account of that of the past of the relation of thought and feeling to physical processes; and it may be that the qualities of the mind will be studied through the organism as we now study the character of a force through

the affections of ordinary matter. We believe that every thought and every feeling has its definite mechanical correlative; that it is accompanied by a certain separation and remarrying of the atoms of the brain. This latter process is purely physical; and were the faculties now possess sufficiently strengthened, without the creation of any new faculty, it would doubtless be within the range of our augmented powers to infer from the molecular state of the brain the character of the thought acting on it, and, conversely, to infer from the thought the exact molecular condition of the brain. We do not say—and this, as will be seen, is all-important—that the inference here referred to would be an *a priori* one. But, by observing, with the faculties we assume, the state of the brain and the associated mental affections, both might be so tabulated side by side that, if one were given, a mere reference to the table would declare the other. Our present powers, it is true, shrivel into nothingness when brought to bear on such a problem, but it is because of its complexity and our limits that this is the case. The “quality” of the problem and the “quality” of our powers are, we believe, so related that a mere expansion of the latter would enable them to cope with the former. Why, then, in scientific speculation should we turn our eyes exclusively to the humble past? May it not be that a time is coming—ages, no doubt, distant, but, still, advancing—when the dwellers upon earth, starting from the gross human brain of to-day as a rudiment, may be able to apply to these mighty questions faculties of commensurate extent? Given the requisite expansibility to the present senses and intelligence of man—given also the time necessary for their expansion—and this high goal may be attained. Development is all that is required, and not a change of quality. There need be no absolute breach of continuity between us and our loftier brothers yet to come.

We have guarded ourselves against saying that the inferring of thought from material combinations and arrangements would be an inference *a priori*. The inference meant would be the same in kind as that which the observation of the effects of food and drink upon the mind would enable us to make, differing only from the latter in the degree of analytical insight which we suppose attained. Given the masses and distances of the planets, we can infer the perturbations consequent on their mutual attractions. Given the nature of a disturbance in water, air, or ether—from the physical qualities of the medium we can infer how its particles will be affected. Here the mind goes with certainty along the line of thought which connects the phenomena, and from beginning to end finds no break in the chain. But when we endeavor to pass by a similar process from the phenomena of physics to those of thought, we meet a problem which transcends any conceivable expansion of the powers which we now possess. We may link over the subject again and again, but it eludes all intellectual presentation. We stand at length face to face with the Incomprehensible. The territory of physics is wide, but it has its limits from which look with vacant gaze into the region beyond. Whence come we; whither go we? The question dies without an answer—without even an echo—upon the infinite shores of the Unknown. Let us follow

matter to its utmost bounds; let us claim it in all its forms to experiment with and to speculate upon. Casting the term "vital force" from our vocabulary, let us reduce, if we can, the visible phenomena of life to mechanical attractions and repulsions. Having thus exhausted physics, and reached its very rim, the real mystery still looms beyond us. We have, in fact, made no step toward its solution. And thus it will ever loom—ever beyond the bourne of knowledge—compelling the philosophies of successive ages to confess that—

"we are such stuff
As dreams are made of, and our little life
Is rounded with a sleep."

6.—The French *Académie des Sciences* has held its sittings regularly since the commencement of the siege, and the *Comptes rendus* has been published regularly every week. Every sitting is reported fully, and several numbers have had even more than the average number of pages. A large part of them is devoted to military science and to ballooning. The scheme put forward by M. Dupuy de l'Ome was fully discussed and illustrated by copper-plates: an article contributed to the *Presse*, by Mr. Giffard, the celebrated engineer, when reporting upon his aerial experiments as much as twenty years ago, has been reprinted. It was shown that Dupuy de l'Ome's experiment was almost of the same nature, and the *Académie des Sciences* has apologized for not publishing it in proper time. M. Dumas and M. Elie de Beaumont, although members of the former Senate, now act in their capacity of *secrétaires perpétuels* of the Academy. M. Leverrier has not appeared at any of the sittings. M. Charles is most punctual in his attendance. Lectures are given at the *Conservatoire des Arts et Métiers*, and are to be given at the *Collège de France*. No lectures have been given this season at the *Sorbonne*. Since the commencement of the siege, a few numbers only have been issued of the *Revue des Comptes Rendus*; *Les Mondes* and *Cosmos* have been entirely suspended.—*Nature*, December 8, 1870.

7.—The *British Medical Journal* quotes the following description of "The Nemesis of Tobacco," from the ninetieth observation of Theodorus Kerckringius, M. D. (*Spicilegium Anatomicum*, Amsterdam circa 1670) describing the *post-mortem* appearances of an inveterate smoker: "Too greatly, now, alas! in Europe, prevails that *cacoëthes* sucking up the smoke of the herb tobacco, as they call it, through tubes actually manufactured for that special purpose! In consequence of what a perversity of morals has arisen they must have noted what a duty it is to attend to the public morality, whether they be politicians or theologians. How noxious it is to the health of those who indulge in the habit of sacrificing so often to Vulcan, or rather to Charon, I shall not here explain. Let it suffice, that I adduce the case of a man whose body I opened before the Faculty. He, ordinarily given to these fuliginous delights, had scarcely ever engaged in any kind of work, as it appeared, without inhaling this fatal juice. When, however, at length, Nature, assailed by frequent attacks, began to fail, and to give way to disease, he rejected for so long a time a black-looki-

matter, both upward and downward (*per utrumque gutturem*) that at last he vomited forth his dusky soul; which to accompany in its visit to the realms of Pluto would be far from agreeable, for, I suspect, it would greatly, and that from habit, have preferred those black lakes, steaming with the bubbles of Stygian vapors, to the lucid stars of heaven, inasmuch as it had long been fed, though not nourished, by smoke; the abode, however, it had relinquished, I visited and examined by the aid of the scalpel of the anatomist. What did I observe, you ask? It appeared to me that I was passing into the very house of Pluto himself; even the entrance-doors were tinged of a black color, and the tongue, imbued, as it were, with the poisonous juice, was in a state of tumefaction. What as to the windpipe? It was like the inside of a chimney, coated completely with black grime. The lungs were dry, sapless, and scarcely at all friable. The liver, as if it, beyond all the other organs, had attracted the fire, was altogether inflamed; from the flames of this fire not even the bile in its receptacle had been safe, for its color had changed from purple to green (*ex purpureo virescentem*). In the intestines, however, the drains of the body, the carbonaceous matters from the whole combustion had become concentrated, for they were full of a black substance which exhaled no milder stench than that of hell itself. Such, of this frequent suction, are the medicinal fruits!—*Nature*, December 8, 1870.

THE editor takes great pleasure in calling the attention of the readers of the JOURNAL OF PSYCHOLOGICAL MEDICINE to the change of type, by which the publishers have added more than a third to the original amount of matter. He would also state that, during the ensuing year, four clinical lectures, delivered by him at the Bellevue Hospital Medical College, will be given in each number, making sixteen in all, and presenting a practical view of many of the most important diseases of the nervous system. The histories of the cases by Dr. T. M. B. Cross will be particularly full and explicit.

The Original Communications, Reviews, and Chronicle, will be of the usual excellence and fulness.

BOOKS RECEIVED.

Essays on the Use and Limit of the Imagination in Science. By John Tyndall, LL. D., F. R. S. London: Longmans, Green & Co. 1870. 8vo, pp. 72.

Origin of Civilization and the Primitive Condition of Man; Mental and Social Condition of Savages. By Sir John Lubbock, Bart., M. P., F. R. S., etc. New York: D. Appleton & Co. 1870. 12mo, pp. 380.

An Introduction to the Study of the Osteology of the Mammalia. Being the substance of a Course of Lectures delivered at the Royal College of Surgeons of England in 1870. By William Henry Flower, F. R. S., etc. With numerous Illustrations. London: Macmillan & Co. 1870. 12mo, pp. 344.

The Origin and Development of Religious Belief. By S. Baring-Gould, M. A. Part II.—Christianity. New York: D. Appleton & Co. 1870. 12mo, pp. 388.

Galvano-Therapeutics: The Physiological and Therapeutical Action of the Galvanic Current upon the Acoustic, Optic, Sympathetic, and Pneumogastric Nerves. By William B. Neff, M. D. New York: D. Appleton & Co. 1871. 12mo, pp. 161.

The Pathology and Treatment of Venereal Diseases; including the Results of Recent Investigations upon the Subject. By Freeman J. Bumstead, M. D., Professor of Venereal Diseases at the College of Physicians and Surgeons, New York, etc. Third edition, revised and enlarged. With Illustrations. Philadelphia: Henry C. Lea. 1870. 8vo, pp. 704.

Medical Progress. An Oration on the Forty-seventh Anniversary of the Medical Society of the County of Kings. By A. N. Bell, M. D., etc. Brooklyn. 1870. 8vo, pp. 33.

Report of the Resident of Brigham Hall, a Hospital for the Insane, for the Year 1871. New York: D. Appleton & Co. 1870. 8vo, pp. 44.

Syphilis of the Nerve etc. By E. A. Keyes, M. D. New York: D. Appleton & Co. 1870. 8vo, pp. 44.

A Contribution to the History of New Hampshire. By B. Crosby, A. M., M. D., before the New Hampshire Society. Nashua, 1870. 12mo, pp. 11.

La Manie Raisonnée. Campagne. Par le Dr. Paris: Germer Baillière 1870. 8vo, pp. 132.

First Medical and Surgical Report of the Boston City Hospital. Edited by J. Nelson Borland W. Cheever. Boston: Little & Co. 1870. 8vo, pp. 11.

A Tabular History and Statistics of all the undoubted Cholera and Typhus Fevers at the Boston City Hospital from the date of its Opening in 1864, to June 1, 1869. By W. H. A. M., M. D., Professor of Surgery and Physician to the Hospital. Printed from the first volume of the Hospital Reports. Boston, 1870.

Lectures upon the Disease of the Rectum. Delivered at the Hospital Medical College. 1869-'70. By W. H. A. M., M. D., Professor of Principles of Surgery with the Genito-Urinary Organs. New York: D. Appleton & Co. 1870. 12mo, pp. 164.

The Physics and Psychology of Spiritualism. By William H. A. M., M. D., Professor of the Mind and Nervous System at the Bellevue Hospital Medical College. New York: D. Appleton & Co. 1871. 12mo, pp. 8.

THE JOURNAL OF PSYCHOLOGICAL MEDICINE:

A QUARTERLY REVIEW OF

DISEASES OF THE NERVOUS SYSTEM, MEDICAL JURISPRUDENCE,
AND ANTHROPOLOGY.

VOL. V.]

APRIL, 1871.

[No. 2.]

ORIGINAL COMMUNICATIONS.

ART. I.—*Opinion in the Matter of Probate of a Paper propounded as the last Will and Testament of WILLIAM HERTZEL, deceased.* By the Hon. R. C. HUTCHINGS, Surrogate.¹

THE SURROGATE :

The paper which is propounded for probate as the last will and testament of William Hertzel, deceased, appears to have been formally executed on the 11th day of February, 1869.

The paper propounded is as follows :

"I, William Hertzel, of the city of New York, do make, publish, and declare this as and for my last will and testament.

"*First.*—I direct my executors, hereinafter named, to pay all my just debts and funeral expenses.

"*Second.*—I give and bequeath to my executors, hereinafter named, the sum of twenty-five thousand dollars upon the trusts and for the purposes hereinafter named.

"*Third.*—It is my will, and I hereby direct, my said executors to invest the said sum of twenty-five thousand dollars

¹ The Surrogate desires to express his thanks to Dr. Hammond for assistance in referring him to medical authorities in support of the opinions advanced.

in good and permanent securities, and collect and reinvest the same as often as may be necessary, and to collect and receive the interest and income therefrom, and pay the same over and over again as collected to my wife, Sarah Cornelia Hertz, so long as she shall live, provided that my said wife shall accept the provisions of this will in lieu of all dower, and in lieu of all other rights, property, or interest in my estate, real or personal, of which I may die seized or possessed, or to which I may be entitled by will or otherwise. And at the death of my said wife it is my will, and I hereby direct my executors to pay over to and equally divide among my brothers and sisters the said principal sum of twenty-five thousand dollars. Should any of my brothers or sisters have died leaving child or children then surviving, it is my will that said child or children of such deceased brother or sister of mine shall receive such portion of the said principal sum of twenty-five thousand dollars as the parent of such child or children would have been entitled to have received, if living, under the clause of my will.

“*Fourth.*—I give and bequeath the whole of the residue of my estate, real and personal, of which I may die seized or possessed, or to which I may be in any way entitled by will, or otherwise, to my brothers and sisters who may be living, and to the children of any brother or sister of mine who may have died leaving children, to be equally divided among them in such manner that my surviving brothers and sisters may each receive equal portions thereof, and the children of any deceased brother or sister may together receive a portion, equal to any surviving brother or sister of mine, and the same portion that the parent of such children would have been entitled to, if living, under this clause of my will.

“*Fifth.*—I hereby constitute and appoint Thomas F. Jeremiah, Daniel Underhill, and George W. Hertz, as executors of this my last will and testament.

“In witness whereof, I have hereunto set my hand and seal the eleventh day of February, 1869.

“WILLIAM HERTZEL. [L. s.]

“The foregoing instrument was now here signed, published and declared by the testator, William Hertz, as and for his

last will and testament in our presence, and in the presence of each of us, and we, at his request, and in his presence, and in the presence of each other, have subscribed our names thereto as witnesses.

"R. M. G. DODGE, 49 Oxford Street, Brooklyn, L. I.

"AMOS J. HATFIELD, Lefferts Street, fourth house east of Franklin Avenue."

It should be observed that this will, which bequeaths the sum of twenty-five thousand dollars in trust, during the life of Sarah Cornelia Hertz, the widow of the testator, makes even the vesting of this sum conditional upon the surrender by the wife of any dower interest which she would take in the real estate in which her deceased husband was interested.

It does not appear that he left any real estate, except an interest in remainder, which he had with his brothers and sisters in his father's estate. Hence, unless the widow would formally renounce all claim to her dower right in her husband's share of the estate left by his father, the executors would not be obliged to invest the sum of twenty-five thousand dollars for her benefit during her life, and she would be left entirely destitute, so far as any provision was made for her by her husband's will; as it appears that the estate of the father of the testator would not be divided until the death of the testator's mother, who is still living.

There is no evidence to show that Mr. Hertz and his wife lived otherwise than on the most affectionate terms.

The widow contests the probate of the paper propounded by George W. Hertz, an executor, on the ground of mental incapacity on the part of the testator to execute a will. The testimony presented on the part of the proponents and contestants is very voluminous, and it is only possible for me to refer to a few of its general features.

Both parties are agreed as to the insanity of Mr. Hertz after his return from the South in the month of —, 1869, but in regard to the time preceding his attack of January 18, 1869, and the intervening period between it and the date of his departure from this city, February 11, 1869, it is claimed by the proponents that Mr. Hertz, although weak of body, was of

sound and disposing mind and memory, while the contestant declare that at no time after January 18th, and especially up to the 11th day of February, was the decedent possessed of the mental capacity which would enable him to make a valid will.

The testimony bearing upon this question is that of Dr. Belcher, the physician who attended Mr. Hertzel, those relatives and acquaintances who were familiar with his daily life and the statements of Mr. Hatfield and Mr. Dodge, who witnessed the execution of the document here propounded as his last will and testament.

Some light is also afforded by the evidence of Dr. John J. Crane, a well-known practising physician of this city, and Dr. George Wilkes and Dr. D. Tilden Brown, of the Bloomingdale Insane Asylum, the latter two of whom were called in consultation with Dr. Belcher over his case in May, 1869; particularly that of Dr. Brown, as to the special character of the disease under which Mr. Hertzel was suffering.

The testimony of these medical witnesses was admitted, although objected to by the proponent, for the purpose of characterizing the disease of which Mr. Hertzel was then afflicted so as to judge, if possible, of the condition of the decedent's mind at the time of the alleged execution of the will.

The substance of the statements made by witnesses in regard to Mr. Hertzel's illness is as follows: For many years the deceased was afflicted with a chronic abdominal complaint which, although a subject of remark among his friends, did not appear to have interfered with his attention to business. Some of his friends imagine that of late years they noticed a slight change in his disposition, but if there was any marked alteration prior to the summer of 1868 it was very slight, and is not mentioned by many other witnesses whose opportunities for observation were equally good.

In the summer of 1868, according to Mrs. Hertzel, he began to complain of his head; she at the same time noticed an unusual dulness of comprehension on his part, and Mrs. L. gatt testifies to a change in his disposition, indicated by frequent unnecessary and causeless quarrels with his relatives on Staten Island, where they were both visiting.

This witness also declares that his deportment lost its former gentlemanly character, and his behavior became gruff and sullen.

In November, 1868, his wife observed that he had grown suspicious, was disposed to be morose and taciturn, and a tremulousness of the hand, which had formerly been almost unobservable, increased in severity, and his manner of walking underwent a peculiar change. This peculiarity of disposition and manner was also apparent to Mrs. Kones on the occasion in October, 1868, when he called to engage rooms, and often afterward at her table when they were boarding with her in Twenty-third Street. Mrs. Hertzel also states that during the latter part of that year he had such difficulty in pronouncing certain words as to impair distinct articulation. On Christmas Day she for the first time heard him tell exaggerated stories, brag of his possessions, and speak in a bombastic style. The testimony of those who were intimate with the deceased from that date (December 25, 1868), until January 18, 1869, especially those persons who met him at his store and saw him at his boarding-house, indicates that the physical condition of Mr. Hertzel was characterized by tremulousness, difficulty of locomotion, and general languor of appearance, while his mental condition was totally changed, inasmuch as he was disposed to be more talkative, introducing those subjects of conversation he had formerly avoided, speaking boastingly of his wife at his store and at his table, bragging of his wealth and acquaintances. On the 18th day of January, 1869, he had a severe attack of dizziness at his store; he called several of his *employés* together, shook hands with them, saying that they would probably never see him again, and was removed to his residence in a carriage. When the members of his family were gathered about him that evening, it is stated by his wife that he inquired for his father, who had been dead many years. Dr. Belcher, who was called to attend him, observed that he did not readily comprehend the questions put to him, was slow in answering, and pronouncing his words with difficulty. The pupils were slow and did not react naturally, while his tongue was very tremulous. This same witness states that when he again saw him on the 5th, 6th, 8th, and 9th of February, the

symptoms indicating disorder of the nervous system were much worse, and, in his professional opinion, degeneration of the brain had already taken place. From this time until February 11th, the day he started South, Mr. Hertzel's physical condition improved. The testimony relating to his mental state, however, shows that during this interval his conversations and actions were of a character never observed before. Instead of the moroseness he had been accustomed to exhibit he became boastful and exhilarated; his fits of sullenness occurred but rarely. At the table he bragged of his wealth; whenever the subject of money was introduced, he was rolling in riches; he possessed rare and costly wines; and his promises of presents were profuse and grotesque. To intimate friends he related stories that were not only improbable, but, had he cared to reflect, he would have known that his auditors were personally cognizant of their falsity—such as the account of his brother's burial, and his own wedding-presents. At the table he behaved in a manner totally different from his former habits, and his continual boasting and bragging, his excited manner and peculiar conduct, conveyed to the other boarders the impression that he was a drinking-man. Instead of his former moodiness and taciturnity, he talked excessively, and all his words and acts indicated great self-exaltation. Sitting as he did at the left hand of Mrs. Kones, the boarding-house-keeper, he would tell her the same story over and over, not only on separate occasions, but many times at every meal. These stories were always exaggerated, and invariably related to his own exploits. His conduct with the servants was undignified in the extreme. About this time, Miss Kones, imagining that the use of liquor had something to do with Hertzel's conduct, observed his habits very attentively, to satisfy herself upon that point. The contents of his clothes were examined for liquor, and, when Mr. Hertzel was unusually excited, this lady personally investigated his breath, but finally came to the conclusion, evidently contrary to her expectations, that drinking had nothing to do with his condition. When it was determined that he should go South for his health, his conversation about his preparations partook of the same peculiarity. His journey was to be a big thing. T

men on the street were hurraing for William Hertz. A band of music was to escort him to the steamer, and from his destination he was to forward presents to his friends—the hind-quarters of a bear and grapes as large as eggs. Yet his memory was so much impaired that he forgot the day he must sail, in order to have the care and companionship of a gentleman friend.

In his own room it was noticed by Miss Kones that he would suddenly start from the sofa on which he was resting, and laugh uncontrollably. When sitting quietly in his chair his face would wear a vacant, idiotic expression, and the saliva would dribble from his mouth; and, when he attempted to converse on other subjects than his personal importance and ideas of grandeur, his stories were pointless and nonsensical. The same psychological characteristics are manifested in the incongruous and unnecessary character of the purchases he made or proposed to make, preparatory to his journey, and in his inability to count the money received from his book-keeper is apparent the weak and treacherous state of his memory.

On the morning of February 11th, it was stated by Mrs. Kones that Mr. Hertz was unusually nervous in his deportment; assistance was required to seat him at the table, and she had to prepare his food for him. While eating his breakfast he again repeated his proffers of presents, and his conversation was bombastic in the extreme. When it was time to pack their baggage, Mr. Hertz insisted upon helping; and, when the trunk that contained Mrs. Hertz's clothing was finished, Mrs. Kones, noticing it to be unlocked, asked him for the key, so that it might be secured. The lids were separated an inch, and the white garments were sticking out, yet Mr. Hertz, looking directly at it, declared that it was locked and securely fastened, and refused to let Mrs. Kones have the key. Mrs. Hertz's attention was attracted to it, and, at her request, Mr. Hertz immediately surrendered the key. Mr. Leggatt testifies that Mr. Hertz appeared in his store that morning, and desired to make certain purchases, which he considered unnecessary, and, upon his refusing to sell him the articles, Mr. Hertz readily acquiesced.

When he was taken to Mr. Leggatt's home and directed to lie down, he obeyed, and remained there until that gentleman returned, and told him that it was time to go home and get ready for the ship. Mr. Leggatt says that he appeared to have no idea where he was; didn't know the dock where the steamer lay, that was to carry him away; and it afterward transpired that he had forgotten an engagement he had made to dine with his family on that, the last day he was to remain in New York.

At a later hour of the day he appeared at the office of the Pacific Fire Insurance Company, in company with Mr. Thomas F. Jeremiah, his brother-in-law, and in the presence of A. S. Hatfield, and R. M. G. Dodge, it is testified to, that he executed the paper which is propounded as his will.

In response to the questions put to him by his brother-in-law, Mr. Jeremiah, whether he desired Mr. Hatfield and Mr. Dodge to witness his signature, and whether he did declare that to be his last will and testament, he responded affirmatively. It also appears in the evidence that he was indisposed to read the document, saying he supposed it was all right, but upon Mr. Jeremiah's telling him he must do so, "he then looked at it," as one of the witnesses testifies, though Mr. Jeremiah testifies he read it through, and said "it was all right." These witnesses declare that on that occasion Mr. Hertzell was rational in action and conversation, and that they did not doubt the soundness of his mind. It is important to be observed that just prior to this interview Mr. Hertzell, accompanied by Mrs. Jeremiah, left his wife in the carriage at the door, with the statement, in reply to her question as to where he was going, that he was going to arrange some matters relating to his father's estate.

The proponents have also presented several acts of the decedent for the purpose of showing his sanity, such especially as signing checks, but it is proper to observe that insane men often exhibit acts which, considered in and of themselves, may be the clearest evidence of sanity. No one act, however, of itself, is either evidence of sanity or insanity. To determine the mental state of a man we must know all we can of his actions before and after the execution of any particular docu-

om such judge of his mental condition, to which, ast be added the opinion of professional witnesses. reafter refer more particularly to the transaction tion of the will at the office of Mr. Jeremiah, and y of the executor, Mr. Jeremiah, who prepared t which is presented as the will of the decedent. important, as bearing upon the question of the ition of Mr. Hertzol, to consider what was the : disease which it is alleged by the contestant had growing upon him, and which struck him so fatally day of January, 1869, that he was ever thereafter l from business, and rendered to a great extent a

icians who held a consultation over Mr. Hertzol 69, are unanimous in expressing the opinion that utterly and irrecoverably insane. Dr. D. Tilden superintendent of the Bloomingdale Asylum, one xians then present, pronounced the disease to be technically known as the general paralysis of the

mony of Dr. Belcher, his family physician, who to attend him on the day of his attack and after home to his house, is as follows :

led William Hertzol for some time as his physi- about the 18th of January, 1869, on which day to see him ; his situation as to health of body or time, as near as I can recall the circumstances, is t was in the evening when I saw him ; he was in nearest reply I could get was, that he had been h chronic diarrhoea, and that he had a recurrence ime. I observed that his manner was absent, or answer questions promptly or readily ; that he was nd that there was great general debility of his as system. I prescribed for him mainly in refer- diarrhoea. I believe I was there to see him three ession. I observed, from the peculiarities of his ical expression of it, that there was serious im- the whole nervous system ; there was inability in walked with a shuffling gait ; in answering ques-

tions they were answered not readily, as though the man had been awakened out of sleep; the tongue was tremulous, as far as my memory serves me; his pulse was rather slow; the supposition in my mind at the time was, that the symptoms were generally those indicating some serious disease of the nervous system, in all probability softening of the brain. I had hoped from the fact that he had had diarrhoea for a long time, besides being informed that his business affairs had been complicated that it might be a case purely, so far as the nervous system was concerned, of anæmia of the brain. I was called to see him again on the 5th of February. I saw him consecutively on the 5th, 6th, 8th, and 9th; it is not easy to recall all the minute circumstances—the minute details of symptoms. I made no memoranda at the time. I rather carry in my mind the general impression made upon me of his condition. At that time evidently his nervous system was in a worse condition, his inability to walk and use his limbs coördinately was more seriously impaired, the tremulousness more marked. He had, so far as I remember, some recurrence of diarrhoea; from what I observed in his case, I had no reasonable doubt in my mind that there was degeneration of the brain; that was in February. After my visits, then he went to Savannah or out of the city. I saw him in April; his condition then showed symptoms of advance of his disease, so much so as to make the case morally certain of the result; the disease indicated that the cause of softening of the brain was progressing, and that the end was morally sure to be mortal; the symptoms evidently showed that his case would be mortal; the inability of walking was increased; the condition of the mind was evidently more and more clouded, and in conversation reference was made to impossible events; in a word, the symptoms of softening of the brain were so clear as to make any hope that it was a case of anæmia absolutely impossible. He went out of town about the 12th of June. I prescribed for him from my office in the months of July and August, and the 2d of September. I went to see him in the country at New Milford. There was a consultation of Dr. Brown, of the Bloomingdale Asylum, and Dr. Wilkes, of New York, and myself, on the 17th of May; his condition at that time, as

arked before, was simply a further development of the storms of his disease; he had hallucinations which I observed myself; the condition of the mind at times would suddenly loom up, and he would speak quite clearly, but that would give way soon to a dulness of comprehension—a difficulty of getting his ideas together—the difficulty of coördinating his words, and the mind would carry an impression of what had occurred, which would continue and be improved; he was unable, apparently, to throw it off, although in moments of consciousness he would know plain enough that these things were not as the hallucinations, or as the impressions conveyed to the idea.

Q. What was his general condition as to sanity or insanity at the time?

A. I should answer this question in this way, and the answer would cover the whole ground from the time before he came to the South: The idea that I formed was, that the mind did not act reliably; that it would not be governed clearly by the will; that the brain was in that condition, that by an effort or by an attempt at thought and reflection, the memory would give out, and that no reliance could be placed upon any action or any expression of mind that implied a condition of thought or study, or of reflection; in that cloudy state of mind it would at times glimmer out, but that by any continued effort or thought it would break down, and I consequently consider that his sanity was certainly not reliable from the time I first saw him. . . .

Q. The testimony of Dr. D. Tilden Brown is as follows:

A. I have been a physician of the Bloomingdale Asylum for the insane in this city from 1848. I have been chief physician for eighteen years. I have had a great deal of experience with people both of sound and unsound mind in my profession. I have known William Hertzell once to my knowledge only, at his residence in Thirty-third Street, near Fourth Avenue. I was in consultation with Drs. Wilkes and Belcher from one to two hours.

Q. What was his disease?

A. In my opinion it was disease of the brain, which is ordinarily called softening of the brain, or general paralysis of the

insane. I saw him, in conjunction with Drs. Belcher and Wilkes, and we conversed with Mr. Hertzel as far as he was capable of conversation, for about the time that I have mentioned, testing the condition of his mind, mainly in reference to the possibility of his being benefited by any suggestions of medical treatment or other care that I might be able to suggest. The conclusion to which I arrived was, that his mental and physical condition was so far impaired by the disease that I could suggest nothing that would be remedial in its tendency, and that his disease was necessarily a fatal one. The only thing to be done for him in life was to make him as comfortable as it might be.

Q. Did you examine particularly with respect to the soundness of his mind?

A. I was called for that purpose, I supposed, and endeavored to satisfy my mind upon that question. I formed the opinion that he was a man of unsound mind, and that there was no probability of his ever becoming sane.

Q. Can you mention any particular circumstances as to your examination of him—what was said—what he said?

A. Very few; for the reason that I made some memoranda of the examination on my return home, which were shortly afterward destroyed accidentally, and I have never been able to see it since. I have not made any since; and the impression left on my mind in regard to the particulars of the interview are vague and general, with the exception of the latter part of the interview, which, indeed, was a second visit, as you might say, occurring, of course, at the same morning, but after having left the room—all of us having left the room—I was told that Mr. Hertzel had signed an instrument purporting to be his last will and testament, and at my suggestion the other gentlemen and myself returned to ask him some questions with regard to the nature of that instrument. His responses to the queries then propounded to him were very clear and definite to my mind. He told us that he had made a will; he had signed an instrument—meaning his last will and testament—giving the whole of his property to his wife. I asked him if he gave his property outright to her. He said he did. I asked him if he gave her the whole of

and he said he had done so. Whether he had or not, of the nature of the instrument was, I know

did not see it?

I don't know, except from what he told me.

Would you, from the nature of his disease and your examination at that time, state how long he had been so afflicted, and of sound mind?

I could not positively. I should think that the disease may have originated within less than five or six months, and I expressed the opinion at the time that he could not live over a year, if he did that time.

What disease, when it once develops itself, a continuous?

Yes.

All cases?

I think there are no well-authenticated cases of any kind of it. The disease may be arrested for a time in its progress, and the patient may live possibly three and some years, but that is very rare.

Is the action of the mind, from the early development of the disease, reliable, or are they (the patients) insane? How often does a disease do they become really of unsound

mind? There is a great diversity in that respect. In some cases the mind seems to be affected before the physical system; in others the contrary is the truth. Every case differs from other cases.

Are those attacks sometimes acute and sometimes of slower development?

I think they are rarely acute, as we understand the disease. They generally commence insidiously, and progressively, so that the true nature of the disease is rarely discovered for some time after its commencement by the relatives of the patient.

At the examination the following questions were put to the witness for the proponent:

Suppose you had known that the fact was that the testator had not been left to his wife absolutely, but he had

merely left a life-interest in his estate, would not you, as a expert, have thought it a proper test of his sanity to have suggested the error to him, to see whether it was mere forgetfulness or unsoundness?

A. What error?

[Question repeated.]

A. What error? Q. He said he left it to his wife absolutely?

Q. Suppose you had known that the information he gave you was incorrect—that he had really left it for life, would not you have thought it a proper test in investigating the soundness of his mind to have suggested to him the error to see whether he would then recollect it and it was a mere mistake, or whether the statement he had made was from unsoundness of mind, having forgotten all about it?

A. If I recollect right, I did ask him whether he had given his wife—and put the question repeatedly whether he had given the property outright to his wife or had given her the income of his estate for life, and he on each occasion said he had given her the property outright.

Q. In some cases the disease progresses without creating unsoundness of mind much further than it does in others?

A. Yes, sir; without creating so great unsoundness of mind. I think that in all cases there is more or less impairment of mind, and at a comparatively early stage of the disease; but there is no doubt that patients vary in their mental condition from time to time during the progress of the disease.

Q. You have seen cases where the presence of the disease was quite marked, and you have failed to detect unsoundness of mind?

A. No, sir; I have not seen such cases as that except in ordinary paralysis, but not in this form of general paralysis in which class his case comes.

Q. But the disease may exist without unsoundness of mind?

A. Not that disease.

Q. What do you mean by the disease; do you mean from its very earliest appearance, from the very earliest symptoms there is unsoundness of mind?

. I think—from the time the disease is appreciated as a disease—I think there is more or less impairment of the mind, if the individual is compared with himself—his previous mental condition—it presents an appreciable disturbance and impairment of the mental faculties.

. But then the presence of the disease would be quite evident, would it not?

. I think it would be recognized by a physician in all cases, but we frequently find that the friends fail to appreciate the real character of the disease. His disease was rather dementia, not delirium; occasionally there were attacks of great mental agitation; there was some emotional agitation; he was when there was no cause for it.

. From what you saw of him on the 15th of May could you form any reliable opinion as to what was his mental condition three months previous?

. No, sir.

. Could anybody?

. I think not, as a reliable opinion.

. The testimony of Dr. Wilkes substantially, though briefer, is the same as Dr. Brown's.

. John J. Crane, a well-known practising physician, testified that he was intimately acquainted with William H. Melville when he attended him on his return from the South, and that he was an insane man affected with softening of the

brain. It appears to me that, considering the testimony of Dr. Crane as to the nature of his disease being the "general paresis of the insane," and that it could not have originated less than five to six months, and in the absence of any other, though scientific, hypothetical questions based on the facts of the testimony being put to this witness or the other professional witnesses, it is necessary and proper to examine and apply the sound doctrines of recognized scientific authorities to the facts as presented, and to determine with as much certainty as possible whether the disease with which he was afflicted at the time of the consultation in May, and from which he died, was the same disease under which he suffered from the time of the severe attack on the 18th day of January, and whether

the singularities and eccentricities of the conduct of Mr. Hertzel from that period to the consultation were the proofs of the full existence of that disease from the 18th day of January to the 11th day of February, 1869, the date of the execution of the will, especially whether it was that character of mental disease which immediately weakens and incapacitates the mind, and is not intermittent, but is continuous until it renders the sufferer a mere drivelling idiot.

The only precise definition of the mental disease which Mr. Hertzel had was given by Dr. D. Tilden Brown, and which was based upon the thorough examination which he made of the testator. He characterized it as the "general paralysis of the insane." Dr. Belcher called it degeneration of the brain and softening of the brain.

I shall take the opinion of Dr. Brown, he being the physician who made the examination of the testator more of a specialty than the other physicians, and also from the fact that he has devoted his professional life to the study of mental diseases.

The counsel on both sides have argued the case upon the premises that he had softening of the brain, which, although it has its similarities, is somewhat a distinct disease from that which is called "general paralysis of the insane." And it appears to me that all the peculiarities which marked the conduct of the testator from the 18th day of January, 1869, the date of his original attack, up to his death, denote that this was the disease under which he was suffering, and not merely softening of the brain.

An examination of the distinct characteristics of softening of the brain and general paralysis of the insane, as defined by the standard and accepted authorities on mental diseases and applied to the peculiar conduct and acts of the testator, in connection with the testimony of Dr. Brown, will facilitate a correct conclusion as to his disease.

Softening of the brain is essentially that waste which is not counterbalanced by repair, and may come from the long continuance of work (old age) or excessive mental exertion and its undue relation to rest. During the functional activity of any organ, and especially one so delicately organized as the

in, its organic structure is worn away, but under ordinary circumstances this waste during exercise is restored by the increased amount of material which it takes up during sleep. When from any cause this supply of nutritive matter is interrupted, and the process of repair impeded, it is but a question of time until this functional derangement is succeeded by organic disease.¹ The character of the disease is determined by peculiarities of the individual constitution, and its hereditary tendency to particular affections. In like manner the part of the body in which the disease manifests itself is that in which the greatest strain has fallen. When the nutritive supply of any part of the human brain is interfered with, the matter disintegrates and liquefies, and is taken up and carried off by the neighboring blood-vessels, and ultimately a cavity is formed in the cerebral matter corresponding in size to the nourished region. To this state of the brain medical authors apply the names *cerebral softening*, or *ramollissement du cerveau*—synonymous terms.²

This lesion most commonly occurs in the white or conductive matter of the brain, and not in the gray or power-producing substance. It is also in the vast majority of cases limited to one lateral half of that organ.

The indications by which the physician recognizes this disease are of two kinds: first, the statements made to him by the patient; and, second, those physical alterations which he himself recognizes by means of medical appliances.³ Both classes of facts go by the general name of symptoms, and refer to the mental powers, muscular strength, and sensory elements of the individual.⁴

The characteristic change in the mental powers of a person suffering from this disease is one of weakness. This is earliest indicated by failure of memory, which varies in the progress of the affection from the merest inability to remember dates and names to an entire forgetfulness even of his own family

¹ Reynolds's System of Medicine, article on "Softening of the Brain."

² Sankey on Mental Diseases, English edition, Lecture IV.

³ De Costa, Medical Diagnosis, p. 109.

⁴ Diagnosis of the Diseases of the Brain and Spinal Cord, by Russel Reynolds, English edition, article "Softening of the Brain."

and doubts as to his own personality. In the same manner the intellect weakens, the volitional power becomes unreliable and the patient sinks into the condition known as *dementia* in which he is incapable of thinking, because the organ of thought has lost the power and the force necessary for performing its functions. The emotional feelings are easily excited, and the individual gives way to laughter or tears upon the slightest provocation. It is important to remember that there is nothing like exaltation of manner ever exhibited by the sufferers from this affection.¹

The muscular system is affected by a paralysis more or less extensive, the distribution of which is of great value in determining the existence of the disease. The muscles of the face, and occasionally those of the eyes, are among the earliest implicated; soon those of the extremities are also affected, but the paralysis is limited to one lateral half of the body, producing the condition known as hemiplegia, but is never generally distributed.² These symptoms are due to the fact that the part of the brain affected is the white matter, the portion of that organ whose function it is to convey the impulses by which we move our limbs. The condition so induced is very characteristic—one that is not only readily recognizable by the trained observations of a physician, but one which readily strikes the non-professional observer. The distorted face and paralyzed side of an individual suffering from cerebral softening present such striking features as not to be speedily forgotten by a witness.³

In like manner the sensations of such a patient are characteristic. The senses of sight, hearing, and touch are implicated on the paralyzed side, which is also, at times, the seat of excruciating pains.

So much for the essential nature, mental characteristics, and physical indications of softening of the brain. And now let us consider in the same manner the general paralysis of the insane—the diagnosis at which Dr. Brown arrived in Mr. Hertzels's case.

¹ Abercrombie on Diseases of the Brain and Spinal Cord.

² Todd on Nervous Diseases, English edition, p. 90.

³ Romberg on Nervous Diseases, edition New Sydenham Society, vol. ii

The power-producing substance of the brain is first affected, and, as a consequence, mental symptoms are primarily developed. As the disease progresses, the conducting substance becomes implicated, and paralysis manifests itself. These changes take place in those portions of the brain which serve to hold together its various parts.¹

As the disease progresses this substance becomes unnaturally abundant and of increased consistency, pressing upon and seriously injuring that most important part of the organism.

Next we have this change extending downward, attacking the portion lying among the white fibres at the base of the brain, reproducing among these elements the same process as initiated above—first irritating and then destroying them.

The symptoms which accompany this disease are as clearly marked as those of the preceding affection of softening of the brain, and are so entirely different that it is strange the two complaints should ever be confounded. The mental changes will be considered first.

During the incipient stage of the disease, and long before any reason is given to anticipate the advent of such an affection, it will be noticed that the patient labors under great depression of spirits.*

This melancholic stage may be indicated either by the altered habits and bearing of the individual as regards cheerfulness and joviality of disposition, or it may also be apparent in the forebodings of evil to which he gives expression. After lasting a variable period of months or years, this stage is succeeded by another phase of the disease characterized by *physical* as well as *mental* peculiarities. First among the former will be the altered mobility of the tongue, producing defects of articulation and loss of muscular power in the region of the mouth, causing an entire change in the expression of the countenance. Shortly afterward a spasmodic movement of the limbs, usually limited to the upper extremities, declares itself, and is speedily followed by diminished muscular power all over the body.*

¹ Maudsley, *Physiology and Pathology of the Mind*.

² Griesinger on *Mental Diseases*, edition New Sydenham Society, p. 330, *et seq.*

³ Griesinger, *loc. cit.*

From these causes a change is effected in the manner of walking and general bearing of the individual, which is denominated incomplete general paralysis.¹

As the disease advances, the degree of muscular paralysis increases, and, when it arrives at that stage when the patient is confined to his bed from inability to use his limbs, we see the significance of the term *general paresis, or general paralysis of the insane*, as used by medical writers.

Generally preceding, but sometimes occurring coincidently with these paralytic phenomena, there is a peculiar and characteristic change in the mental symptoms.² From the stage of profound depression which marks the earliest appearance of the disease, as the morbid process advances, the patient begins to exhibit evidences of preternatural exaltation. For an early period of his disease, indeed, he has been the victim of a gradually-increasing delusion, an exaggerated estimate of his own powers.³ At first this change will not be continuous; fits of sullenness will alternate with paroxysms of exaltation, but finally it will be seen that the patient dwells continually in this new mental state.⁴ What this mental state is, is very hard to express in words, yet there appears to be a difficulty in recognizing and appreciating it when a patient with this affection is under observation.⁵ Certain phases of the mind are exalted, as the faculty of imagination; certain others very much weakened, as the memory of places and surroundings; while from the action of the disease, delirious ideas, distorted by this mental condition, are continually expressed.⁶ That mental power by which the man's expressions and actions are regulated and controlled is so distorted as to produce results incongruous with his previous character and present position, while the memory of recent events, and especially for property and possessions, is either radically defective or completely biassed by his delirious ideas.⁷

As a consequence of this mental state the general paralysis

¹ Sankey on Mental Diseases, English edition, p. 142.

² Esquirol on Insanity, American edition, p. 438.

³ Austin on General Paralysis.

⁴ Feuchtersleben, Medical Psychology, Sydenham Society edition.

⁵ Maudsley, loc. cit. ⁶ Esquirol, loc. cit. ⁷ Sankey, loc. cit.

expresses himself in a manner different from that of any other form of mental malady. His ideas of personal importance are all exaggerated, and partake of the nature of the subject presented to his thoughts. They also vary from moment to moment.

"The miserable sufferer who can scarcely support his tottering body avers that he has the might and vigor of Hercules; while industriously hoarding up pieces of rag, paper, or glass, as articles of value, he will sign a check for countless millions, or make an easy present of New York; maintaining that he can command a king to do his pleasure, in the same breath he begs piteously to be allowed to go to his own humble house, or, with sexual power extinct, boasts exultingly that a princess should be his wife and princesses be born of his loins.¹ An extreme loss of memory is in striking contrast with the semblance of exaltation," etc. In pursuance of the idea that he is rolling in riches, he will squander what he really has, while one disposed to play upon his momentary caprice will have no difficulty in persuading him to enter into ruinous engagements.² Medical works are filled with instances in which the first manifestation of the disease has been the financial bankruptcy of the sufferer—one who has still possessed sufficient intelligence to avoid mentioning the ideas of grandeur and magnificence which filled his mind, while he has gratified his secret impulses by embarking in enterprises that would have required all his imaginary wealth to carry out. In almost every case this exalted sense of personal importance expresses itself in meaningless illustrations—narratives of exploits in their nature impossible—yet told in an earnest and sincere manner that will deceive those unacquainted with the individual's disease.³ He seems to see every thing through a captivating medium which magnifies the importance of every thing he feverishly pursues.⁴ Again, it will show itself in acts of prodigality and wastefulness—never in penuriousness or thrift.

From Dr. William A. Hammond's forthcoming work on

¹ Reynolds's System of Medicine, article "Insanity."

² Griesinger, loc. cit.

³ Romberg and Esquirol, loc. cit.

⁴ Austin on General Paralysis.

Diseases of the Nervous System, I make the following extra relative to the mental symptoms of general paralysis of the insane :

“At first the general mental type is that of depression the emotions are easily excited, and the delusions which soon make their appearance are of the melancholic form. The idea of propriety in the every-day acts of life seems to be lost and the patient will commit all kinds of indecent acts without appearing to be aware that he is doing any thing unusual. His memory fails very rapidly, and his intellectual vigour declines from the very first. Hence he is not able to argue in defence of his delusions, but attacks with physical force those who venture to differ with him. His acts are in other respects eccentric and absurd. He spends money in things which are of no manner of use to him, and, at the same time refuses to pay his small debts. He harasses in every possible way those who are about him—gives them impossible orders and then abuses them if they are not at once obeyed. He is whimsical at the table—his likes and dislikes are changed, and he either eats and drinks voraciously, or declares that nothing is cooked to suit him, and leaves the table in a rage. Gradually the form of his mental aberration changes; he becomes more cheerful, forms all kinds of impossible schemes for suddenly acquiring great wealth, and these are quickly abandoned for others equally impracticable. Thus delusion after delusion rapidly succeed each other, and these, in the great majority of cases, relate to the grandeur, the wealth, the physical strength or some other great quality of the patient, constituting the *délire des grandeurs* of the French. One will tell of his immense palaces, built of gold, and inlaid with precious stones, and, in the next breath, will descant of his great weight, or his extreme lightness, or of the number of children he has, or of the millions of operas he has composed. Another urges his great importance in the political world, tells that he has elected all the members of Congress himself, that he has paid off the national debt, and that, in consequence, he is to be made Emperor of the United States, with a salary a thousand millions a year, that he is going to have a thousand physicians, who are to be clothed in blue-velvet uniforms

embroidered in gold and diamonds; that he has chartered the Great Eastern for a pleasure-trip, and engaged ten thousand musicians and a similar number of ballet-dancers to go with him. The next day he has forgotten all these fancies, and is off on another series of absurd ideas. In no respect is he restrained in the extent of his delusions: impossibilities are not regarded. While scarcely able to drag one leg after the other, he will brag of his great fleetness of foot, and in the very death-gasp will mutter about his extreme strength and endurance."

This mental state increases in all its peculiarities until the progress of the paralysis renders the patient almost helpless. Finally, like softening of the brain, it results in complete *dementia*, and in this stage we find two diseases presenting analogous symptoms. At this time, all the authorities agree, nothing but the history of the complaint, as related by the observers, can enable any physician, however skilful, to determine in a given case whether cerebral softening or general paralysis of the insane has been the cause of the pitiful state into which the poor sufferer is reduced.

A moment's consideration of the phenomena presented in Mr. Hertzel's case, viewed in the light of the preceding remarks, can leave no doubt as to the category in which it should be placed, and compels me to agree with the opinion of Dr. Brown, after his critical examination of the decedent, and of the history of the case, that his disease was the general paralysis of the insane, and not softening of the brain, as was suggested by other witnesses.

In agreeing with the opinion of Dr. Brown, as to the nature of Mr. Hertzel's disease being general paralysis of the insane, it is not so difficult to solve the question of the dividing line between responsibility and irresponsibility, capacity and incapacity, as in softening of the brain. In softening of the brain it is more difficult to define this line, in the first stages of the disease, with the same degree of accuracy as in "general paralysis of the insane," which is the disease which Dr. Brown states he had when he examined him, and which must have lasted "from five to six months." This opinion of Dr. Brown, as to his disease being the general paralysis of the insane from

which he died, and which he must have had for months, were applied to the acts, expressions, and conduct of the decedent for months before February 11, 1869, and even on that very day when it is alleged he performed the act of putting his signature to the document propounded as his will, proves conclusively to my mind that he was incapable at the time of understanding the nature, character, and consequences of the act he then performed, and that his act was merely automatic, under the influence of a controlling mind, and that the acts of the decedent were merely the obedient action of a man whose mind had been reduced by disease to childlike obedience.

From a careful review of the testimony adduced in relation to the mental and physical condition of William Hertz, deceased, from October, 1868, until the date of the document here propounded, in my opinion it must be held:

First.—From October, 1868, until January 18, 1869, he was suffering from the incipient symptoms of general paralysis of the insane;

Secondly.—From January 18th, until February 11th, and afterward, the disease had manifested itself to such an extent as to render him insane; and—

Thirdly.—At the time of the execution of this document he was not possessed of sufficient mind and memory to know the force and bearing of the instrument he then signed, and that the same is not his last will and testament.

It is true that William Hertz affixed his signature to the document which is propounded as his will; but was the act of signature the act of a man with a clear, sane mind, who understood the purport of the provisions contained therein, written closely and covering four full pages, or was his signature merely an automatic act, guided and controlled by a superior mind? The power to affix a signature to a will, or even to sign checks, as it is alleged the testator did, does not prove competency so far as the law requires to perform such a solemn act as the making of a last will and testament. They may be mere automatic acts. Insane people write letters, edit and write articles for and publish magazines in lunatic asylums, and yet are confined in these asylums as helpless lunatics, because they are incapable of taking proper care of their property or themselves.

The rule as laid down in the Stewart-Lispenard case, and presented to me by the counsel for the proponent, is not the rule which now controls the courts in this State.

We must now regard as settled law, applicable to questions of probate, the following rules determined by the Court of Appeals in the Parish will case, as laid down in the learned and elaborate opinion of Mr. Justice Davies, viz. :

"That in all cases the party propounding the will is bound to prove to the satisfaction of the court that the paper in question does declare the will of the deceased, and that the supposed testator was, at the time of making and publishing the document propounded as his will, of sound and disposing mind and memory.

"That this burden is not shifted during the progress of the trial, and is not removed by proof of the *factum* of the will, and the testamentary competency by the attesting witnesses, but remains with the party setting up the will.

"That if, upon a careful and accurate consideration of all the evidence on both sides, the conscience of the court is not judicially satisfied that the paper in question does contain the last will of the deceased, the court is bound to pronounce its opinion that the instrument is not entitled to probate.

"That it is not the duty of the court to strain after probate, nor in any case to grant it, where grave doubts remain unremoved, and great difficulties oppose themselves to so doing.

"That the heirs of a deceased person can rest securely upon the statutes of descents and distributions, and that the rights thus secured to them can only be divested by those claiming under a will and in hostility to them, by showing that the will was executed with the formalities required by law and by a testator possessing a sound and disposing mind and memory."

Now, in this case, the proponents admit the mental sickness under which the decedent suffered ; admit many of the extravagant acts and conduct which characterized Mr. Hertzell from the time of his original attack until his death, though claiming that they were not evidences of insanity—admit that he was insane at the time of his death, but claim that just at

the time he executed the will he was entirely sane, and that the previous acts were not those of an insane man, although subsequent acts, no more eccentric and extravagant, indicated unsoundness of mind.

The proponents have, however, failed to present a single medical witness, as against the positive testimony on the part of the contestant, upon the question of sanity, and the burden of proof upon proponents was not, according to the second rule settled in the Parish case, shifted during the progress of the trial, or removed by the proof of the *factum* of the will as to the testamentary competency by the attesting witnesses.

Amid this conflict of doubt, I am obliged to take the evidence of Dr. Brown, and conclude that his judgment is the best to be had, that the mental disease under which he was suffering on the 17th day of May, 1870, when he examined him, had made him an insane man, and he must have had for several months.

And that he is supported in his opinion by the evidence of his acts and conduct previous to the execution of the will, not merely from the day when he was stricken in his store as he was carried home, and where he asked for his father who had been dead for years, but that the incipient movements of the disease were shown for months previous, as denoted by his eccentricities and extravagances.

In this connection it may be instructive, as bearing on the duration of his disease, to cite the remarks of Austin in his celebrated treatise on General Paralysis (p. 71):

“And I may here mention my belief that in all cases of general paralysis the duration of the mental unsoundness, even if honestly stated, is underrated. The slow and steady advance of the dementia, the gradual approach of his end, his eccentricities, whims, and fancies, and generally the untending character of the early physical and mental symptoms, so completely break in the near relatives of the paralytic the oddest ideas and acts, and so entirely throw them on their medical attendant off their guard, that when acts evidently insane supervene, they are regarded as mere accessions of the eccentricity which has been growing on him for years! But no sooner does he commit some personally viol-

or discreditable act than the scales fall from their eyes, and, however unwilling to admit his gradually increasing alienation for months or years, they are ready, and even anxious, to date it from the violent or disgraceful action."

How pertinently these remarks apply to the case of William Hertz! The proponents deny that the strange and eccentric acts of William Hertz, so different from his previous conduct prior to his departure for the South, were evidences of unsoundness of mind, but admit that he was insane shortly afterward on his arrival in the South, and also admit that "personally violent and discreditable acts," which characterized him after his departure for the South, were evidences of his insanity.

There are, however, other considerations which the testimony in this case strongly presents against the propriety of admitting this paper to probate as the will of William Hertz.

They are the alleged instructions as to the preparation of the will which Mr. Jeremiah, one of the executors, testifies to—the preparation of the will itself—the manner in which it was presented to the testator, whose mind was undoubtedly irresponsible, even if he was not entirely insane, and the manner it was presented to him for signature, and the peculiarity with which the formalities of execution were observed.

I will not claim that either one of these characteristics in itself, or all united, would be sufficient to refuse probate to the will of an entirely sane man, but certainly, when operated on a man with the shattered intellect of William Hertz, they must be considered as being fatal to those solemnities which the law throws around the execution of a will.

Mr. Jeremiah testifies that he prepared the paper which is signed by William Hertz and attested by Amos J. Hatfield and R. M. G. Dodge as subscribing witnesses, and propounded as the last will and testament of William Hertz—that he prepared it from verbal instructions given to him by the testator on the night of the day succeeding that on which he was taken sick at his store. The testimony of Mr. Jeremiah as to his instructions is as follows :

That he saw the testator on the 19th day of January—the

day after he was brought home from the store; that they had a conversation in relation to the making of a will, and that he prepared the will which is now before the court for probate.

The evidence as to these instructions, which were not written, but verbal, depends entirely upon Mr. Jeremiah, who is not a lawyer. The whole testimony in the case bearing upon the instructions and the preparation of the will show that Mr. Jeremiah, who is the husband of a sister of the testator, was extremely anxious that a will should be made by Mr. Hertz, as he alleged, for the protection of the widow as well as the brothers and sisters, while he must have known that the widow would be better protected under the statute of distributions without a will than under such a will as he made.

The instructions which Mr. Jeremiah alleged he received were, on the 19th day of January, 1869—the day after the serious attack—when the incipient symptoms of the disease under which he had been suffering from October, 1868, developed into that attack which had, in my judgment, rendered his mind so shattered as to be incapable of collecting in his mind, without the prompting of a superior mind, such as that of Mr. Jeremiah, the details of his property, to hold them there for a sufficient time to perceive their more obvious relations, to appreciate the relative claims of those dependent on his bounty, and to a final disposition of his property.

Moreover, although he received those instructions on that day, he did not prepare the will until the 10th of February the day before he left for the South.

It should be here stated that Mr. Jeremiah, after he prepared the will, never handed it to the testator to be read until the morning he stopped for a few minutes at the Pacific Fire Insurance Company while on his way to the steamer.

He deferred giving it to him to read until the time when he had but a few minutes for the purpose, so as to arrive at the steamer seasonably. But his conduct in relation to the will, while acting undoubtedly for the interests of those whom he may have conscientiously believed to be more entitled to the property of the testator—to wit, his brothers and sisters, one of the latter of whom was his wife—than the wife of the decedent without issue, shows to my mind that he so unduly

stood the shattered condition of the mind of Mr. Hertzelt that he also feared to appear to be too controlling in all the minutiae of the execution of the will.

The following extract from the testimony of Mr. Jeremiah is important in this view :

" I told his sister, my wife, to tell Carrie, another sister, when William came there to dinner that day to give him that will, and laid it on the mantel-piece, and it lay on the mantel-piece in the front parlor."

Q. That is all the principal knowledge you have about the matter?

A. That is all.

Q. You next saw it with whom and where?

A. The next time I saw it he came to the office with it in his hand.

Q. When they came down to the office, do you know whether he got out, or whether Mrs. Jeremiah got out first and came in and announced his arrival?

A. I was in the rear office; the first that I saw any thing he came in the office with the will in his hand; he immediately said to me, "Counsellor"—he always called me counsellor—"I have been so busy, been so much delayed to-day, that I have not had time to read over this will; I suppose it is just as we talked about it." He came alone in the office.

Mrs. Hertzelt gives her account of the time when the will was executed with such secrecy from her under the auspices of Mr. Jeremiah.

After testifying of going with her husband to the house of Mrs. Jeremiah, his sister, to dine, she testified:

I could not say how long we remained there—it was not very long—long enough to eat dinner.

Q. Was you with Mr. Hertzelt all the time?

A. I was up in the hall a few moments with the ladies, and they went down to dinner and I went down also.

Q. Did you see any will handed in there to Mr. Jeremiah?

A. No, sir.

Q. Then what took place—what was done next?

A. We bade them adieu and left the house, and went down to the Pacific Insurance Company. We remained there about five minutes.

In connection with the effort, as it is obvious to me, of Mr. Jeremiah to have it appear by the circumlocution by which the will was to be brought into the hands of Mr. Hertz, and from which the testator might appear to be the active agent in making his will, and not the mere automatic servitor of his brother-in-law, should be recalled in conversation of the decedent with Mr. Charles G. Ackley, as evincing his doubts of the successful probate of a will of such a mentally-diseased man as William Hertz.

Mr. Ackley testified that he went to the house of Mr. Jeremiah on one evening in the early part of the month of May with his daughter, and then had an interview with him in relation to this will.

Q. Did he say any thing to you, or in your hearing, to the effect that the will was really good for nothing, and could be easily broken if not satisfactory?

A. He did not say to me that the will was satisfactory, but after having stated that the will was made in conformity with the wishes of Mr. William Hertz, he then added, however, "We cannot tell what the effect or result will be of a will made under such circumstances; if there is any thing wrong about it, it would be rectified before the surrogate."

Mr. Jeremiah had the frankness to doubt considering the condition of Mr. Hertz, whether the will of Mr. Hertz would be probated, and added that, if wrong, "it would be rectified by the surrogate," as appears by the testimony of Charles G. Ackley; yet with this knowledge, governed by what he may have believed to be his duty to his wife and her family, he conveyed in the circuitous manner I have detailed to this irresponsible being, a paper for him to sign as his will, which cuts off his wife from what would be her rights as a widow without a will. Mr. Jeremiah, it appears by the evidence, had been in the habit of transacting the business of Mr. Hertz. It was, in my opinion, one of the acts which the law calls the undue influence of a strong and healthy mind over an intellect prostrated by disease—over a man whose conduct had been characterized by the most extreme hallucinations—over an intellect without power or motive, because incapable of reasoning, to resist.

His conduct at this time showed the condition of his mind as it must have been, when compared with its characteristics for weeks before, on the very morning itself, and afterward commencing immediately on the steamer, and followed without intermission in his sojourn in the South.

Miss Carrie Hertz, the sister of the testator, who was called for the proponents, testified that, while on the steamer to Savannah, he complained to her that three watches had been stolen from him the night before, while the fact was, that he had only one watch. Yet the proponents claim that he was sane the day he left the city, on which day he signed the will—he was sane, and yet here is an evidence of insanity, within twenty-four or forty-eight hours after his departure.

He exhibited no inclination to read the will, for the reason that his mind was incapable of any continuous operation. Mr. Jeremiah admits that he was very nervous. He could not conscientiously deny this mild definition of the state of his mind. The subscribing witnesses, not so well acquainted with him, beheld only one who responded automatically to the leading questions which Mr. Jeremiah put to him.

There is not a particle of testimony presented, except that of Mr. Jeremiah, as to any declarations of the testator as to the disposition he intended to make of his property. But there is a subsequent declaration by him in reply to a question of Dr. Brown, that he had left all of his property to his wife, which it is, however, claimed by the proponent should have no weight, as he was then undoubtedly insane.

I cannot, however, fully agree with the counsel in his opinion. It is an accepted doctrine by all standard authors and by the scientific experts in mental diseases, that a man whose mind, through disease, is incapable of any process of reasoning, and therefore incapable of managing or to make a legal disposition of property, yet may retain in his memory his feelings of affection toward his wife, children, and relatives, especially in the form of disease as was manifested in the decedent, and of his acts conceived in affection, which he performed, or believed he performed, during the progress of the disease. And he especially recollects his intention formed during health, and uncontrolled by any momentary caprice or

influence exerted over him. Though with a shattered mind and one incapable of grasping, even by reading, or to appreciate sufficiently to hold in his mind the details of a document which is put before him to sign, and which a superior and controlling mind impresses him with the belief that it is a document as he intended it to be, he yet may recollect distinctly the intention of the disposition of his property, springing from affection, which governed him. In fine, a man with an extremely shattered mind may have intelligence enough to recollect that he signed a paper of the nature of a will, and yet have been wholly incompetent at the time in the eyes of the law to examine or appreciate its tenor or effect, but still believing in his confidence in and through the influence of a superior and controlling mind that the instrument embodied his real intention. Moreover, the spontaneous utterances of a man in the condition that Mr. Hertzelt was at the time of his examination by Dr. Brown, toward those near and dear to him, unless prevented by a controlling and undue influence may be of the nature of those in health.

The law is very zealous against straining after probate when the preparation of a will is made by a party interested to be executed by a person of doubtful capacity, and requires that to support such probate there must be strong proof of intention outside of the interested party, who claims to have acted under instructions. As very pertinent to the case is the language of the court (1 Phillimore's Reports, p. 193):

"The court must take a cautious view in deciding questions of law and fact; it is an established principle that where capacity is doubtful at the time of execution, there must be proof of instructions or of reading over. A man in a languid torpid state, may easily acquiesce in signing his name to a will set before him, more especially when he knows that there is something in the paper which he wishes to take effect, the presumption also is strong against an act done by the agency of the party benefited, the act is not actually defeated as it would be by the civil law, provided the intention can be fairly deduced from other circumstances. Though the court will not impute fraud, it will require strong proof of intention."

In this case there is no evidence of the intention of the

decendent, except that given by Mr. Jeremiah, whose wife and children are benefited by this will, and a benefit to one's family is of the strongest controlling influence.

In fact, all the reasons pertinently put in this opinion of the "caution that should be observed where capacity is doubtful," apply pointedly to this case.

Even if he answered the leading questions that were put to him by Mr. Jeremiah, the interested party who made the will, he answered them not only "in a languid, torpid state," but exhibited even a disinclination to read it, and was undoubtedly in such a diseased mental condition that his mind could not grasp the importance of the act which he was performing.

And in considering this part of the case before me, I am fortified in my views by the opinion of Mr. Justice Willard, in *Robertson vs. Caw* (3 Barbour's Rep., 415), wherein he says: "The party who receives instructions for a will from a testator, and above all the party who draws the will, should be a disinterested person. The conduct of the scrivener who derives the slightest benefit under the will has always been watched with jealousy. The presumption is strong against an act done by the agency of the party benefited" (1 Phill. Ecc. Rep., 187). And again, in *Crispell vs. Dubois* (4 Barb. Rep., 17), the doctrine is recognized that when an alleged will was prepared by a person standing in a fiduciary relation to the deceased, and who took a large benefit under the will, some affirmative evidence should be given that the testator knew the contents of the will; that the law inferred knowledge in the testator of the contents of a will executed by him, when the full enjoyment of his mental faculties, unimpaired by disease, and when the party drawing the will took no interest in it; but, if the understanding was weakened by disease or otherwise, then the jury, before they found the alleged will valid, ought to be satisfied (and the same principles apply here), from other evidence than mere signature, or the formal acts of bare execution, that the testator knew its contents; that the facts and circumstances attending its execution, connected with previous declarations of intention, or directions to have such a will drawn, should be so strong and convincing as to satisfy the jury that the alleged will was, in every respect,

the will of the deceased, and the result of his own free and unbiassed judgment, and executed with full knowledge of its provisions.

The formalities of the execution of the document were spoken by Mr. Jeremiah, the prompter and instructor of the weak and sick man.

When the evidence of the various witnesses as to his conduct previously, and that of the physicians, is considered, more and more pertinently does the reasoning of this learned judge apply to the peculiar case of William Hertzell.

Not being judicially satisfied upon the evidence before me that, at the time of making and publishing the paper purporting as a will, the decedent was of sound and disposing mind and memory, or that it contains his last will, it is my duty to decide that the instrument offered is not entitled to probate, and a decree will be entered accordingly.

ART. II.—*The Relation between Lesion of the Nervous System and Muscular Atrophy.* By S. G. WEBBER, M.D. Boston. (Read before the Boston Society of Medical Sciences.)

A CASE of paralysis with atrophy, progressive muscular atrophy, and another of paralysis without atrophy, glossolaryngeal paralysis, led first to the inquiry as to the reason for this difference. My attention was thus attracted to the existence of fatty muscular degeneration in connection with lesion of a particular part of the gray substance of the cord, the tractus intermedio-lateralis of J. Lockhart Clarke. In the cases, where careful microscopic examination of both muscles and cord was made, are given, though several have especial value except that they do not disprove the proposition.

In order to facilitate the understanding of the subject, the following account of the parts of the gray substance of the cord, as named by Mr. Clarke, is given :

The posterior cornu, *p. c.*, is divided into caput cornu and cervix cornu. The caput, *cap.*, consists of a broad or expanded extremity of the cornu, and is separated from the

vix by an imaginary line drawn across from the opposite anterior extremities of the arched lamina of gelatinous substance. The cervix, *cer.*, comprehends the remaining portion of the cornu, as far forward as the level of the central canal.

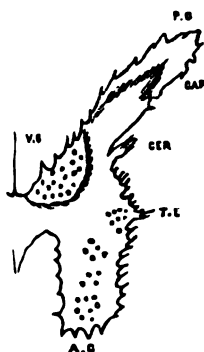


FIG. 1.—Gray substance of middle dorsal region. After Lockhart Clarke.

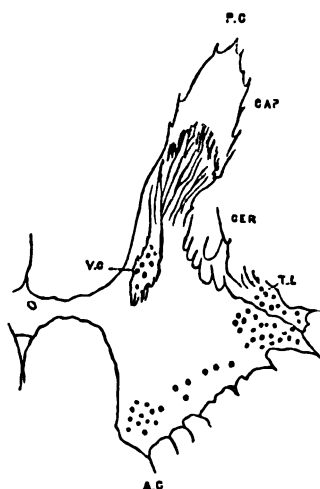


FIG. 2.—Section of spinal cord at lower cervical nerve. After Lockhart Clarke.

The caput cornu consists of an outer or gelatinous substance, and an inner and more opaque substance. The inner or median half of the cervix, on each side, is occupied by a remarkable longitudinal column, which Clarke names the posterior vesiculus column, *v. c.* These consist of a somewhat dark cylinder of fibres interspersed and surrounded by cells and their processes. The posterior roots are intimately connected with these cells.

A band of fibres from the posterior transverse commissure, after curving round the front of the vesicular cylinder, runs nearly horizontally outward to the lateral border of the gray substance and lateral columns. The tract in which this band ends he calls the tractus intermedio-lateralis, *t. l.* It consists for the most part of oval fusiform or pyriform and triangular cells.

The anterior cornu, *a. c.*, contains groups of large multipolar cells, varying in their arrangement at different heights.

In many sections it is possible to divide them into an anterior and inner group, and a posterior and outer group.

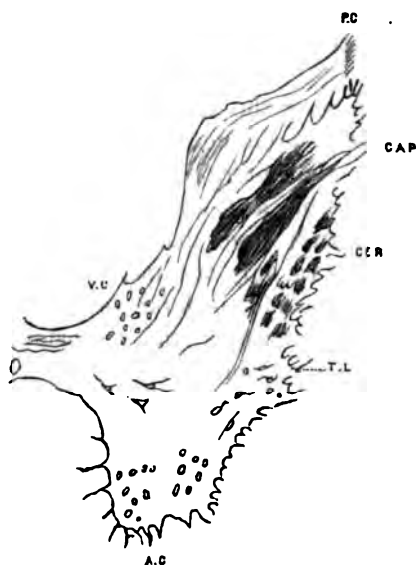


FIG. 3.—Section of spinal cord at fourth cervical nerve. After Lockhart Clarke.

The tractus intermedio-lateralis is larger at the upper part than in the middle of the dorsal region. On the one hand it projects farther into the lateral column, and on the other passes inward across the gray substance to near the front of the vesicular cylinder.

As it ascends, however, through the cervical enlargement, it gradually disappears; but, as in the dorsal region, the lateral portion of the gray substance is still traversed from behind forward by numerous fibres apparently in connection with branched and very elongated cells of all sizes, among which are scattered a few that resemble those of the tractus intermedio-lateralis. Through this lateral portion of the gray substance, the lowest roots of the spinal accessory nerve bend forward to the cells of the anterior cornu.

In the region of the upper cervical nerves there reappears a vesicular tract in the same position as the tractus intermedio-lateralis, and composed of the same kind of cells, which are elongated in a lateral direction and send their processes, on t

the hand, out through the lateral column, and on the other inward to join the fibres of the transverse commissure behind the central canal. It is traversed by the roots of the spinal accessory nerve as they bend forward on their way to the anterior cornu.

In the upper part of the lumbar enlargement the tractus medio-lateralis is prominent at the border of the gray substance between the anterior and posterior cornua, but its fibres are not so numerous as in the upper dorsal region.¹

Atrophy of muscles from disuse is occasionally seen in cases of ankylosis. In only one instance have I noticed an account of the microscopic appearances of the muscles after long disuse. Dr. Bennett mentions an instance in which a limb had been kept immovable for two years or more by means of lead splints, on account of injury from burn. The muscles were replaced by fat in the interstitial tissue, but the ultimate fibres were not transformed into fat, as in fatty degeneration.—(*Dublin Medical Journal*, 1869, vol. xlviii., p. 658.)

In cases of atrophy after lesion of the nerves or nervous centres, muscles do not necessarily pass through the stage of fatty degeneration. The fibres may be diminished in size, retaining their transverse striæ; or they may be diminished in size, also losing in part or entirely their striæ, or may be broken up into large masses, each mass showing striæ, the sarcolemma persisting, with an increase of the nuclei of the sarcolemma filling the vacant spaces, or the sarcolemma may be partly folded on itself. The striæ persisting, they may be obscured by fine granules, or the sheath may be filled with granules or fat-globules. There may be an amyloid, or perhaps, better named, colloid degeneration, which, being found chiefly if not exclusively in acute diseases, as fevers, does not concern us now. That form of degeneration which consists in an increase of interstitial fibrous tissue, or a deposit of fat between the muscular fibres, also does not concern us.

In progressive muscular atrophy there is more or less fatty granular degeneration of the muscles. This is, I believe, a view generally received. (See Jaccoud, *Traité de Patho-*

¹ Philosophical Transactions, 1859.

logique Interne, tome i., p. 355. *Reynolds's System*, vol. ii., p. 173. Trousseau, *Clinique Médicale*, tome ii., p. 551.)

If the fatty or granulo-fatty degeneration is due to a lesion of a limited tract of the spinal cord, it must be that any lesion which shall finally implicate this tract may in the end give rise to that species of degeneration; though, if other regions are first implicated, there may be with the fatty degeneration one of the other species.

The simplest form of paralysis is that which arises from destruction of the nerve in some part of its course between the central nervous system and the muscle; in such a case the muscles do not undergo fatty degeneration; the fibres diminish in size, and the nuclei of the sarcolemma multiply; a few scattered granules may, perhaps, be seen in the muscular fibres.

Vulpian has reported the condition of the muscles in the leg of a woman who suffered amputation six months after excision of the sciatic nerve for myxo-sarcoma. The nerve had not united again, the distal portion contained no normal nerve fibres. The muscular fibres of the gastrocnemii and soleus had preserved their transverse striæ, but in a large number the striation was less clear than in the normal condition; in others it was, however, quite clear. Only an extremely small number of fibres contained a sprinkling of fine fatty granulations. The primitive fibres of the muscles of the superior and posterior region of the thigh were normal and much larger than those of the gastrocnemii and soleus, the latter being at least one-third smaller than the former. The muscular fibres of the posterior part of the leg also showed a multiplication of the nuclei of the sarcolemma, the deep as well as the superficial nuclei being proliferated and more numerous than in the muscles of the upper part of the thigh. In some places they were collected into small groups of three, four, five, and ten. In the intervals of the primitive fibres of the modified muscles there were seen no more adipose vesicles than in the same part of the normal muscles, but the secondary bundles of the muscles in the posterior and superior region of the leg were separated by a larger amount of adipose tissue than in the muscles of the posterior and superior part of the thigh.

Even in the muscular fibres most reduced in size the striation persisted.

He also examined the muscles in animals after section of their nerves.

After section of the lingual and hypoglossal the muscular fibres of the tongue diminished in size with increase of nuclei; but the latter not to so great an extent as in the muscles of the leg, and the development of adipose tissue between the secondary bundles was excessive at the base of the tongue, less at the tip.

Division of the lingual alone produced no change after fifty-four days.

Division of the hypoglossal resulted in atrophy after five months; and after fifty days the side operated on was less thick than the other. The striæ were persistent, and there was development of adipose tissue, with diminution in size of fibres, as when both lingual and hypoglossal were divided.

He concludes that this process of atrophy is always united with an irritative process, revealed especially by the multiplication of the nuclei; there seems to be also a certain degree of hyperplasia of the connective tissue of the muscles.—(*Arch. de Phys., Nor. et Path.*, tome ii., pp. 558–578.)

Dr. W. Erb made experiments on frogs and rabbits by section and by tearing the nerves. He found at the end of eight days in the muscles a commencement of division and multiplication of the muscular nuclei. Twenty-two days after tearing the nerve, the muscles supplied by that nerve were notably altered; the nuclei of the muscular fibres were multiplied and here and there collected into masses. Many fibres showed wavy degeneration, which he thinks may be *post mortem*. The connective tissue was very much increased, and the muscles were consequently firmer and more coherent; that tissue contained numerous rounded and fusiform cells. There was no trace of granular or fatty degeneration of the muscular fibres; there was atrophy of the muscular fibres but the striæ persisted.—(*Arch. de Phys., Nor. et Path.*, tome ii., p. 783, from *Deutsches Archiv für Klin. Med.*, Bd. iv., 1868, p. 555, and Bd. v., 1869, p. 42.)

It will be seen by these facts and experiments that section

of a spinal nerve is not followed by fatty degeneration after five or six months, there being at most merely a few fibres with scattered granules.

Next in order comes lesion of the spinal cord. In some of these cases there is fatty degeneration of the muscles, and in some there is no such change, or only to a slight degree. In the inquiry in regard to this division, unfortunately, many cases of progressive muscular atrophy, which have been otherwise well reported, are of no avail, because the state of the muscles has not been noticed.

The following cases, of which only so much is given as refers to the condition of the muscular and nervous system, may be divided into two classes: first, those in which other than fatty degeneration was present; second, those in which there was fatty degeneration.

Bamberger gives two cases (*Wien Med. Press*, 1869, Nos. 27 and 28); one died in eight months from implication of the respiratory muscles. In both cases the muscles were simply atrophied, the fibres reduced to $\frac{1}{4}$ – $\frac{1}{10}$ the normal size, but retaining the transverse striæ, and only in a few places was there fatty degeneration, and an inconsiderable amount of interstitial fat, nothing else abnormal.

The cord was unchanged throughout. In this first case the anterior roots were extremely atrophic, the fibres contained in places much granular myelin, in places apparently empty sheaths, some fibres were intact.

In the second case the anterior roots were normal; in the atrophied muscles were single degenerated nerve-fibres.

It is possible, or even probable, that in these cases the examination of the cord was not made carefully enough to detect slight changes.

Oulmont (*Gaz. des Hôp.*, 1867, p. 405), relates a case of man who died in a little over a month after getting chilled. The muscles most affected, though apparently healthy, were seen under the microscope to have undergone partial change, the striation being in some points irregular, at other points there was a waxy exudation, and here and there a multiplication of nuclei. There was congestion of the capillaries of the cord, multiplication of the nuclei, but the cells were healthy-

After hardening in chromic acid, nothing abnormal could be seen.

These cases may have been the so-called acute ascending paralysis. In one the nerve-cells are said to be healthy, in the others the cord seemed healthy, but the nerve-roots were atrophied.

The following case is reported by Hayem (*Arch. de Phys., Nor. et Path.*, tome ii., p. 264):

Conture Joseph, aged forty-eight years. Disease continued over six years. No mention is made of the condition of the tongue.

The muscles most atrophied were pale; the adhesion of the fibres was very great. The last slender fibres were composed of tubes of sarcolemma, containing fragments of muscular substance, irregularly divided by transverse fissures. These masses of muscular tissue were pressed against each other, or a space was left between them where the sheath was folded on itself. In other tubes of sarcolemma were seen fragments of muscular substance, and a very great number of nuclei, sometimes isolated and surrounded by a zone of granular protoplasm, often crowded together in groups. No part of these muscles, to the naked eye or under the microscope, had any of the characters of fatty degeneration. The striation was always visible.

The diaphragm had preserved its normal color except at the level of the left phrenic centre, where the muscles were rather pale. There the fibres were small, the striation was well seen, but here and there was a slight granular deposit.

The cervical and several thoracic sympathetic ganglia and the semilunar ganglia showed no changes. The peripheric nerves of the sympathetic were not examined. The two phrenic nerves contained many atrophied fibres and some granular fibres. There were, however, some healthy fibres, but they were fewer than the altered fibres. In the anterior roots of the second, third, fourth, and fifth cervical nerves were a majority of degenerated fibres. The posterior roots were healthy. On section of the cord at level of the second cervical nerve the ends of the anterior cornua were formed of a finely-granular substance, in which could be seen a very

large number of free nuclei and small cells, containing one or sometimes two nuclei similar to the free nuclei. In several specimens it was not possible to perceive at this point any nervous cell, but in most of the others were seen, particularly on the external limits of the anterior cornua, irregular corpuscles filled with fine yellowish granulations, having a scarcely visible nucleus and a very small nucleolus, with one or two prolongations. There were atrophied nerve-cells, five to six times smaller than normal. In the rest of the gray substance were small nerve-cells, some scarcely recognizable, containing a very small nucleus and pyramidal granules. The most numerous and most normal cells corresponded to the tractus intermedio-lateralis.

The posterior cornua seemed nearly normal. The central canal was filled with epithelium.

The case is important, as there was no fatty degeneration, and the tractus intermedio-lateralis and posterior cornua were nearly normal.

The next case is reported by Jaccoud (*Leçons de Clinique Médicale*, p. 328), and the anatomical changes were afterward described by Charcot and Joffroy (*Arch. de Phys., Nor. et Path.*, tome ii., p. 637).

The disease was of three years' duration.

The alterations of the muscles are thus described, as seen under the microscope while in the fresh state:

"1. A number of these fibres had suffered a remarkable diminution in size, though they had preserved very clearly the transverse striæ; some of the fibres thus emaciated had, for example, a diameter six times less than still healthy fibres of the same preparation. The atrophied fibres had generally no trace of any granular deposit in their substances.

"2. Many fibres, some of which had retained the normal diameter, while others were more or less diminished, had peculiar transparency. The transverse striæ were represented by only very fine parallel lines, extremely near together, they had entirely disappeared. In nearly all these fibres even the most altered was a fine longitudinal striation.

"3. Some fibres had lost all trace of striation, and had

hyaline appearance. Most of these hyaline fibres were narrow; they had granulations, generally not numerous, which seemed fatty.

"Between the fibres or bundles of fibres were a small number of very large fat-globules, sometimes with a tuft of crystals on one point of their surface."

These were inflammatory products on the membranes, and the cord from the *corda equina* to the cervical enlargement. The cervical enlargement was unusually developed, so as to resemble a fusiform tumor, which, at the point of greatest thickness, filled the vertebral canal. The meninges were thickened, the gray substance was degenerated in spots, and there were several canals running longitudinally through the cord, in some places implicating the white substance. The largest and longest of these canals was situated on the left half of the cord a little behind the *tractus intermedio-lateralis*. It was entirely surrounded by the gray substance in the upper part of the cervical enlargement, but at the lower part it was confined to the white column. It extended in the white substance, only touching the posterior cornu at one point, to the second third of the dorsal region, where it disappeared.

Another canal was on the median line, so as to implicate both posterior columns. A third was in the posterior cornu on the right extremity through the cervical enlargement. There was also increase of nuclei and neuroglia.

The nerve-cells of the anterior cornua had generally preserved most of their normal characters, only altered by a shortening of their prolongations. Several cells had undergone more or less atrophy, and it seemed as though some had entirely disappeared. In the lower part of the cervical enlargement the changes were less marked.

There was sclerosis of the posterior and antero-lateral columns, apparently of secondary origin.

The examination of several ganglia and cords of the sympathetic gave no decisive results. The peripheric nerves were not examined.

In this case there was a slight amount of fatty change in the muscles, and the changes in the cord bordered on the *tractus intermedio-lateralis*. The canal of degenerated tissue

was situated just behind that tract, and it may have felt some of the morbid influence. Most of the atrophy was, however, other than fatty, and the change was chiefly in other portions of the cord.

Laborde (*De la Paralysie, dite essentielle, de l'Enfance* p. 104) examined carefully a case of paralysis in a child, which he classes with infantile, in which there was no atrophy of the muscles. This child, named Lesage, had, at eighteen months of age, a short febrile attack, followed by generalized paralysis. The arms recovered motion, but the legs remained paralyzed. She died in about a year, with cerebral symptoms.

The muscles of the paralyzed part were not changed essentially, scarcely diminished in size.

The peripheric nerves, anterior and posterior roots, were not altered. The anterior and to a less extent the lateral columns were grayish and transparent, there being a proliferation of the connective-tissue elements, cells, and nuclei. The nervous cells of the anterior gray cornua and posterior cornua were perfectly healthy.

These cases are not numerous, being only six, but they all show that degeneration of muscular fibres follows lesions of the cord; but in some of them was this degeneration of a decidedly granulo-fatty character. Some of the other forms of degeneration were present in a marked degree, and, at most, only a few granules were found scattered over a few fibres. The condition of the sympathetic was noticed in two cases, with negative results.

The cord was found affected either in its white substance there being sclerosis of the antero-lateral columns, or the gray matter was affected, the lesion being confined almost, if not quite, to the anterior or posterior cornua, the tractus intermediolateralis escaping. In one case (Charcot's and Joffroy) there was more granulo-fatty change than in the others, and that case is the one in which the tractus intermediolateralis was the most likely to have been encroached upon according to the description of the lesion. In the others it is either stated that the cells were all normal or the tractus intermediolateralis

contained more and larger normal cells than the anterior cornua, the posterior cornua being also normal.

The next class of cases are those in which the atrophy was caused by fatty or granulo-fatty degeneration.

The first case is very fully reported by Charcot and Joffroy (*Arch. de Phys., Nor. et Path.*, tome ii., p. 356).

Catherine Aubel entered the Salpêtrière, in June, 1865, having been sick about nine months, died in February, 1869, after about four and a half years. The condition of her muscles, as described by the authors was: "1. A diminution of volume in the muscular mass. 2. A pale-yellow color of the muscles. 3. A greater consistence of the muscle, resembling that of connective tissue. 4. A granulo-fatty alteration, slight in some fibres, very marked in others. 5. The division into fragments of the muscular substance. 6. The simple atrophy of some muscular fibres, independently of all fatty or waxy degeneration. 7. The proliferation of the interfibrillary connective tissue."

The muscles of the tongue were changed as above, especially the intrinsic muscles.

Most of the nervous cells of the anterior cornua in the cervical region were atrophied, the cells of the internal or anterior group having suffered most, all of them being more or less atrophied, but, in the external group, on most preparations, one, two, three, and four were nearly normal. The central canal was obliterated by a mass of epithelial cells, the nuclei were unusually numerous in anterior and posterior commissure around the central canal. The posterior cornua seemed healthy.

There was more or less sclerosis of the antero-lateral columns, the posterior columns being healthy.

A similar condition was found in the upper two-fifths of the dorsal region. It was much less marked in the lumbar region.

In the medulla oblongata, above the point of the calamus, the cells of the nucleus of origin of the hypoglossal were almost entirely atrophied or destroyed. The group of cells outside the hypoglossal, which Clarke refers to the facial, were healthy.

The pneumogastric group was slightly atrophied. Below the calamus the hypoglossal cells were affected. The nucleus of the spinal accessory was somewhat affected, some cells being deformed, and having undergone yellow degeneration or black pigmentation.¹

It is not so easy to decide in regard to the condition of the tractus intermedio-lateralis in this case, but it seems that the cells of the anterior cornua near it were affected, and possibly the external group spoken of included this tract.

The next case is reported by Gairdner, Gull, Clarke, et al. (Beale's "Archives of Medicine," vol. iii., p. 1).

Case of Dr. P. Atrophy confined chiefly to arms and hands, with great pain, and an hysterical state of mind. Disease lasted five and a half years.

"Portions of the more atrophied muscles were examined microscopically, and proved to be at some points almost devoid of striæ; but, although very slightly granular in the ultimate fibre, they were by no means in an advanced stage of fat degeneration. The atrophy appeared, on the whole, to have been rather succeeded by the granular deposit, than to have been its consequence." The tongue seems not to have been affected. The sympathetic in the neck was found normal.

On removing the cord, the middle of the cervical enlargement was injured. Changes were found in the posterior gray substance, extending in a variable degree from the lower end of the cervical enlargement to the third cervical nerve. The changes were more conspicuous at its upper than at its lower part.

The morbid changes were around or at the side of blood vessels.

There were spots of granular degeneration scattered through the gray substance, chiefly on the right side, but also on the left, confined to the cervix cornu post, and the commissure, but chiefly the post commissure. At the level of the origin of the fourth pair of cervical nerves there were found several of these spaces, and one of a circular shape

¹ This pigmentation is normal in this situation for a few cells, and abnormal only when it affects a large number of cells.

the left, at the base of the tractus intermedio-lateralis. Some of those on the right were also near the same spot, and according to drawing might have extended partly into the tractus.

"In ascending the cord, from the upper third of the cervical enlargement, the morbid appearances diminished in extent, and gradually disappeared about the level of the third pair of cervical nerves. In the lower third of the same enlargement they were very like those in the upper, and disappeared on approaching the dorsal region. In the middle third, which was unfortunately nearly all destroyed by accident, they were in all probability more extensive than elsewhere."

There was a thick accumulation of corpora amylacea around the central canal, and in smaller numbers through the whole of the anterior and posterior commissures, but not beyond them.

The anterior gray substance was normal.

In this case the degenerated spots were so near the tractus intermedio-lateralis, judging by the drawings and description, as either to implicate them or the fibres proceeding from them. Though imperfect from the injury to the cord, as far as it goes it is in favor of the theory mentioned at the beginning. The anterior cornua were healthy.

A case is reported by Radcliffe and Clarke (*Medico-Chirurgical Review*, July, 1862, p. 215), in which there was atrophy of the tongue and other muscles; the condition of the muscular fibres was not examined under the microscope. The tractus intermedio-lateralis was affected, and the cells of the hypoglossal nucleus were atrophied.

The following case is given by Duménil (*Gaz. Heb.*, 1867):

Roussel, aged sixty-five years, entered the general hospital of Rouen, February 9, 1865. Disease had begun a year before; a weakness of the left arm. The weakness continued to increase, and she lost the use of all her muscles. In March, 1865, she died, about a year and a half after first noticing the disease.

The muscles were examined, and showed complete obliteration of the transverse striæ over some spaces, indistinctness of the striæ in other places; the longitudinal striation was to

be seen in some places where the transverse striæ were wanting; in other places the sheaths were filled with granulations.

The intrinsic muscles of the tongue were normal.

Several nervous branches of the forearm were perfectly healthy. The hypoglossals were slightly altered, the roots of the spinal accessory still more so, the anterior roots of the spiral nerves to the last degree. The posterior roots were altered, but to a less degree.

The posterior and lateral columns of the cord were more or less affected. The anterior columns were less altered.

The cells of the anterior cornua were generally small, without prolongations. There were amyloid bodies scattered through the white substance, especially the posterior columns, and also in the gray commissure around the central canal.

Infantile paralysis is usually followed by atrophy, which is due to fatty degeneration. Two cases have been found in which the cord was examined. One is by Prevost (*Comptes Rendus de la Société de Biologie*, 1865, p. 215):

Marie Joséphine Laurent, aged seventy-nine, probably paralyzed from childhood. Her legs were atrophied and her feet were deformed. The muscles of the left leg were reduced to fat, and there were no striated fibres.

The cells of the left anterior cornu were atrophied, or had in great part disappeared, and on the left side the nerve-roots were diminished in size.

The other is by Charcot and Joffroy (*Arch. de Phys., Nor. et Path.*, No. 1, 1870), the patient having been sick eight years. The muscles had entirely undergone fatty transformation; there was also proliferation of the nuclei of the sarcolemma.

In the cervical region the cells of the left anterior cornu were gone, except a small group on the internal side just anterior to the commissure, which had disappeared on the right side. The posterior cornu was small, the vesicular column was gone, and only a few of its cells were present on the right.

Lower, both sides were affected; and still lower, in the centre of lower half of the dorsal region, the right side was the more affected.

atrophy or paralysis of the tongue has been non-accidentally. In glosso-laryngeal paralysis there is no atrophy of the tongue; but, when the atrophy of other parts precedes the paralysis of the tongue, usually atrophy of the latter also. This apparent atrophy may be due to an increase of adipose or cell-supplying the place of the atrophied muscular. In many cases this explanation will not hold good. It is reported by Trousseau in which it is expressly stated the tongue was perfectly normal, and so were the muscles of the velum palati, of the pharynx &c. The spinal accessory and hypoglossal nerves diminished in size, especially the latter. The anterior columns resembled in color the posterior columns in color. The condition of the nerve-cells, unfortunately not referred to.—(*Trousseau, Clinique Médicale*, 279.)

Following case from Duménil also shows the preservation of muscular fibres:

Faivrotte, aged sixty-four years, was well till the end of 1863. She then had the usual symptoms of bulbar paralysis.

At the end of life, some of the muscles of the upper and those of respiration were affected. The tongue normal size. Under the microscope all the atrophied showed fibres, rather pale, but with the normal striæ. The muscles of the tongue showed the normal striæ, but a considerable amount of interstitial fat.

The anterior part of the sympathetic showed no alteration. The spinal cord seemed to be perfectly healthy.—(*Gaz. Méd.*, p. 442.)

It is scarcely probable that the cord should have been unaffected. Duménil was, however, seemingly diligent in his examinations. The case shows that paralysis is not always followed by atrophy or even by change in the muscular fibres.

It is reported by Charcot which is more complete, in which important changes were found (*Arch. de Phys.*, *et al.*, No. 2, p. 247):

Marie François, aged sixty-eight, died after about one and a half year's continuance of the disease. The tongue had preserved its form, thickness, and normal size. It had had, however, slight trembling movements.

Toward the tip of the tongue, half perhaps of the fibres had undergone a certain degree of granular change, with or without disappearance of their transverse striæ, without very marked diminution of size. On a very great number of the fibres there was a very evident increase of the nuclei of the sarcolemma, and the connective tissue showed more nuclei than normal.

The proliferation of nuclei of sarcolemma was more marked where the transverse striæ were preserved. Here and there the sarcolemma was empty of contractile substance, and filled with masses of nuclei, and some sheaths were folded on themselves and contained only fatty granulations.

Several of the muscles of the larynx had undergone the same change. Also several of the muscles of the extremities had undergone the granulo-fatty change, with an accumulation of fat-drops between the fibres.

The phrenic and sympathetic nerves were normal. Hypoglossal, spinal, accessory, and pneumogastric, were slightly granular in some fibres.

In the lumbar enlargement of the cord the white substance was normal, the gray substance showed a slight increase in nuclei of the neuroglia, and atrophy and disappearance of nerve-cells in the anterior cornua. The change was uniform over the whole of the anterior cornua, and it was not referable to any group of cells. The posterior cornua were unaffected. The changes were the same in the dorsal and cervical regions, but more marked in the cervical. The cells of the vesicular column were altered in the same degree as those which compose the groups of the anterior cornua.

Just below the point of the calamus in the medulla, the hypoglossal nucleus was much altered, the cells only being changed, the neuroglia being intact. The altered cells were scattered over the whole nucleus, perhaps more numerous toward the external limits.

The cells of the spinal accessory were for the most part healthy.

the hypogastric nucleus higher up was also affected, the mogastric not so much so.

In this case there was slight fatty degeneration in the muscle of the tongue. It will be noticed that the altered cells were more numerous toward the external limits of the hypoglossal nucleus.

In the next case (Duchenne and Joffroy, in *Arch. de Phys., et Path.*, No. 4, 1870, p. 499) the tongue remained large and well developed, without trembling movements. The muscles were not examined. The cells of the hypoglossal nucleus atrophied and had disappeared, the alteration being most marked in the cells which were behind and inward, less marked in those which were in front and outward.

The nucleus of the facial was altered more generally, but mainly to the hypoglossal.

In the cervical and dorsal regions the anterior cornua were altered.

Among these cases there are—1. Five cases in which there was no fatty or granulo-fatty degeneration, and one in which the change was very slight; 2. Five cases in which there was more or less extensive fatty degeneration, and one in which there was atrophy, though the muscles were not examined.

In the first five cases, in two, the cells were said to be healthy, and there was no atrophy; in another, there was no degeneration, and the cells of the tractus intermedio-lateral were the most completely preserved of the anterior part of the gray substance; in two, the cord was said not to have changed. In the one where the granular degeneration was slight, there was a possibility that the tractus may have been affected, though it is not said that it was; the granular degeneration was, however, slight.

In the next group of cases, in one, the posterior cornua were healthy, the cells of the anterior cornua were altered, the facial and anterior group very much, the posterior and external group less so; in another case the anterior cornua were healthy, the change being confined to the central part of the substance, the tractus intermedio-lateralis probably being spared; in one case, the tractus intermedio-lateralis is stated to have been affected; there was atrophy, but the condition of

the muscles was not ascertained. In other cases the alterations in the cord are expressed in such terms that the tracts might be included.

To these might be added some in which there was great atrophy, where Mr. Clark found degeneration at the base of the tractus intermedio-lateralis, but, as the state of the muscle is not given, they are imperfect.

To sum up the cases: the anterior cornua have been found affected where there was fatty degeneration, and healthy where it existed. The posterior cornua have been found healthy where there was fatty degeneration. The tractus intermedio-lateralis was found nearly normal where there was no such change; and, where the change existed, that tract was either diseased, or the changes were so described that it might be included. The conclusion from these few cases would be, then, that the central part of the gray substance is that part upon whose lesion depends fatty degeneration of muscular fibre, and of this portion it is the tractus intermedio-lateralis toward which the evidence, as yet obtained, points as the nutritive centre. It is only this latter point which I have not seen mentioned before, though it was not till after the facts collected were found to show that the central part of the gray substance exercised this influence, that I saw the same suggested by Duménil.

As to the nature of the influence by which fatty degeneration is produced, whether by irritation of the cells, or by paralysis of their trophic influence, it is premature to decide. The fact that lesion of nerves does not cause fatty degeneration proves nothing, as the nutritive fibres may follow the blood-vessels.

As to the question which first led to this inquiry—why glosso-laryngeal paralysis is often unaccompanied by atrophy—the answer may be at least in part given. Either the want of atrophy is apparent, not real, the interstitial tissue being increased, or fat being deposited between the muscular fibres. When this is the case, probably fibrillary tremors will be present as one symptom. If, however, fatty degeneration is not present, we must conclude that the group of cells

upon whose lesion this change depends, is not affected. The evidence from the cases collected tends to show that the cells toward the external limit of the hypoglossal nucleus are those upon which the fatty degeneration depends. This is a point demanding more extended investigation.

Finally, another question occurs to the mind: By what course are the trophic fibres from this group of cells distributed to the muscles?

There are a few facts which point to the sympathetic system as the path through which this communication is made.

Schneevogt reports the case of a man, fifty-eight years old, who had progressive muscular atrophy, affecting also the tongue and diaphragm. The muscles had undergone fatty degeneration. The cord was softened from the fifth cervical to the second dorsal; the five superior anterior roots were thin. The posterior ganglia and vagus seemed healthy. The cervical part of the sympathetic was almost transformed into a fatty cord, in which the nervous fibres were replaced by fat. The ganglia were also fatty.—(Schneevogt, cited by Freedberg in *Pathologie und Therapie der Muskellähmung*, pp. 102–104, in *Gaz. Hebdomadaire*, January 18, 1861, p. 38.)

Jaccoud reported two cases in which there was atrophy; the cord seemed healthy, the sympathetic had undergone fibrofatty degeneration, the change being most extensive in the lower cervical region (*Univ. Méd.*, 1864).

Duménil reports two cases (*Gaz. Hebdomadaire*, 1867). In both there was fatty degeneration of the muscles. In both the sympathetic was found degenerated, fatty, or fibrous. In one the cord was affected, the anterior cornua especially; in the other the cord seemed healthy.

These cases open the question in such a way that it would be well worth while to examine the cord and the sympathetic in all cases of muscular atrophy.

ART. III.—*On the Medical Relations of Insanity.* By L. A. TOURTELLOT, M. D., Utica, N. Y.

It is no doubt plain, to all who are familiar with current medical writings, that we have entered upon a period of unusual and important change in the theories of medicine. Our journals are more than ever filled with hypotheses to explain morbid symptoms, or the actions of remedies, and these very generally point in one direction. The mechanical and chemical views of disease which, in different phases, have so long kept the field, are everywhere being abandoned for others in which the nervous force is the primary assumption. Even those diseases which, but a short time ago, were thought the best illustrations of the chemical pathology, are now believed to have their seat in the nervous system. The change promises to be one which will bring medical doctrines thoroughly into accord with the science and philosophy of the time. It evidently belongs to the great movement in scientific thought which is marked by the doctrine of the correlation of forces. When all the physical sciences have been brought together in a doctrine of abstract force, it is certainly not to be wondered at that vital action should no longer continue to be interpreted by the principles of chemistry.

The department of mental disorders has, naturally, been among the first to feel the influence of these new doctrines. Lectures upon this branch have been announced in several of our schools; and the American Medical Association, at its last meeting, adopted a resolution favoring the establishment of chairs of psychology in all medical colleges. But the utility and success of this addition to the curriculum of medical study have been questioned. In fact, all depends upon what is taught, and the subject admits of the widest possible difference of treatment. Supposing that, as stated in the resolution referred to, psychology (medical or morbid psychology is probably meant) is really to be taught, a speedy abandonment of the lectures has been predicted. This has been the result whenever, as in Great Britain and Germany, such a course has been attempted. Doubtless, the medical student is little likely to have a taste for metaphysics, and he has not, at any rate, the time to spare for such a profitless study. Again, in

the expectation that insanity is to be treated of as exaltation, depression, and feebleness of mind, or as chronic delirium in its closest relations to bodily disease, an honorable and permanent place as a study has been promised it. But, before proceeding to inquire what is the true medical theory of insanity, let us first glance at the popular and the legal theories respecting it.

That the meaning of the term insanity in common language is, at the same time, extremely vague and widely comprehensive, will not be disputed. It is, perhaps, best stated as a lack of needful capacity for self-direction and self-control. But insanity is, in general, only faintly conceived as an abstract condition. Certain persons who exhibit peculiarities in their words and actions are pronounced insane, and measures of supervision or restraint are suggested; but there is little notion of insanity as a something apart from the actual case. This, it is to be remarked, is quite different from what obtains in respect to the word disease. The notion of disease as a real existence apart from the patient is a universal and deeply-rooted fallacy. It is rare, however, that insane persons are brought to a medical man, or to an asylum, mainly for the purpose of curative treatment. If this object is sometimes spoken of, it is usually because it has been suggested by the physician, or it is a part of the scheme of deception which is thought necessary in such cases. I may further describe the popular notion of insanity by saying that a difference in its degree is recognized; and not only is a person declared to be more or less insane, but in many cases the insanity is said to be confined to certain subjects or actions. This difference being conceived, it is hardly necessary to state that many persons, by common consent termed insane, are treated as partially responsible for their actions, or as responsible for a part of them.

Law being simply a rule of action founded upon the common reason of mankind, the legal theories of insanity follow very closely the common views. The law, therefore, not only does not treat insanity as a disease, but as far as possible refrains from considering it as an abstract condition. How entirely adverse is the theory of law to the application of prin-

ciples to abstract questions is shown in the celebrated answer of the twelve English judges to the House of Lords. Even the fundamental test of insanity, a knowledge of the difference between right and wrong, is only a test when applied by the court to an actual case, and when accompanied by such explanations and observations as the circumstances may require. In like manner partial insanity is only known to the law from the practical rule that mental disorder limited to a particular subject, or existing in a slight degree only, does not, *per se*, excuse from crime. Monomanias based upon the theory of different faculties which may be separately affected it refuses to recognize. It cannot admit a moral insanity, although based upon what, according to every school of philosophy, is one of the primary divisions of mind. In fine, insanity, in a legal sense, is not a medical question, so it is neither a metaphysical nor a moral one, but a practical problem of responsibility.

The medical theory of insanity is important, not only in its bearing upon practice in the general profession and in asylums for the insane, but also in respect to medical testimony before courts.

A great deal of ingenuity has been expended in framing a definition of insanity, and much has been said of the difficulty of this task. Taken in its general sense, the term is not indeed, definable. It is purely ideal, and in an actual case indicates merely a practical judgment. But there ought to be a difference in regard to its medical meaning. It corresponds exactly to the subdivision "Disorders of the Mind," in the nomenclature of the London Royal College of Physicians and includes all chronic morbid mental symptoms which are not referable to some form of brain-disease. There is difficulty, no doubt, in the discrimination of cases. Some, which are at first diagnosed as a form of insanity, may afterwards prove to be cases of abscess, chronic inflammation, or general paralysis, and *vice versa*. But the principle is the same as in bodily diseases, and the difficulty is the same in kind and often no greater in degree. Where, then, is the point at which confusion has been introduced into the medical meaning of insanity? It is, I believe, in the teaching of certain

authorities that insanity is a disease, and in making this doctrine of fundamental importance. Dr. Tuke, in his standard treatise, after noticing at length the principal definitions, declares it to be "all-important that we should regard disease as the essential condition." But the word disease strictly signifies only disorder of the body, although its meaning has been extended, tropically, to disorder of the mind. Of course, it could not be thought important to declare that insanity is mental disorder, and it must therefore be intended to define it as bodily disorder. Now, we can admit that such a statement might have a useful meaning if designed only to represent in a forcible manner the close analogies between morbid states of the mind and the body. And as in the law it is held that insanity is irresponsibility or incapacity by way of describing the practical issue in certain cases, so it might be said that insanity is disease, to signify that the functions of the physician in respect to cases of mental disorder are the same as toward any other class of patients. But the doctrine is plainly meant to carry a very different meaning from this. I have before referred to the notion that disease has a real though mysterious existence as a distinct entity. Surely this can be nothing more than a popular fallacy. Yet it is plainly in the sense of this fallacy that the theory of insanity as a disease is held by distinguished authorities upon the subject. Perhaps it is usually held implicitly only, but in this form it vitiates a wide range of medical and medico-legal writings. It is not seldom, however, expressly stated. For example, in the chapter on "Mental Alienation," in *Beck's Medical Jurisprudence* (p. 734), I read, "Disease, unlike hypothesis, is fortunately an entity." By too many writers, indeed, this entity is not treated as a vague something, it may be material or immaterial, but as if it were a positive, physical fact. Those who constantly write of their opinions as scientific conclusions, and of themselves as interpreters of Nature, can hardly escape being understood in this sense. Of this number is Dr. Ray, who, in a paper lately read before the American Social Science Association, speaks explicitly of the facts from which insanity is inferred as facts of Nature. Dr. Ordonaux, also, in a paper "On the Value of Expert Testimony," in the *American Journal of Insanity*,

for July, 1870, writes of insanity as "within the range of demonstrative knowledge." But the notion of disease as other than a mere hypothetical entity is, of course, entirely without warrant. Some writers, probably to avoid this fallacy have described insanity as a form of disease. Here, the "form" is the presumed entity. But in a classification of diseases, and especially in one based upon symptoms alone, the form, it is hardly necessary to say, is only a provisional hypothesis. The final issue of this doctrine is reached in the statement¹ that "medical science has declared insanity to be a bodily disease." In fact, however, medical science declares bodily disease to be made up of physical symptoms, while in every formal treatise upon insanity the mental manifestations alone are embraced in its definition. Griesinger, the latest and perhaps highest authority, states that mental disorders can never, in any case, consist of physical signs. The diagnosis, he says, "depends essentially and exclusively upon the mental symptoms."

It is strange that fallacies so obvious as these, and leading so directly to practical errors, should find a place in the doctrines of mental medicine. That the specialty has been so long almost entirely separate from the main body of medicine may perhaps help to explain this, and also the fact that no branch has felt so little the progress of rational therapeutics. In the general profession, the old treatment of bleeding and purging is more practised with the insane than with any other class of patients. The magnitude of this evil is apparent when we consider that nearly all persons sent to asylums have already passed the period for medical treatment. This is said to be true even of Great Britain and Germany, where the number of patients placed in asylums, public and private, is twice as great as with us. How important, then, that the movement led by Griesinger and Laycock, to promote instruction in the principles and practice of mental medicine among general practitioners, should be imitated in this country!

But the errors in the therapeutics of our asylums, reflecting the errors of doctrine which I have described, are also of serious importance. The notion that insanity is bodily disease

¹ Report of the New York State Lunatic Asylum for 1867, p. 15.

would seem to have led to the practical rule that all the insane need medical treatment. How far this unnecessary inference, from a doctrine which is itself a fallacy, has been carried, may be gathered from the various asylum reports. In treating of medication in the Massachusetts asylums, the Board of Charities of that State speak of "the guilt of wasting human treasure and poisoning human blood by the use of noxious drugs," as, in the case of the helpless insane, chargeable wholly upon those who prescribe them. This is extravagant language, for, as compared with some others, these asylums are quite moderate in their use of medicines. In the report of an asylum in a neighboring State, I find its doctrine, that "insanity is one of the most curable of nervous diseases," illustrated, on another page, by the fact that the value of medicines given to an average of less than six hundred and fifty patients in one year was nearly six thousand dollars. Yet it is true, as stated by the Massachusetts Board, that "the most enlightened physicians have nearly abandoned the use of drugs in the treatment of the insane." Maudsley barely alludes to the medical treatment of mental disorders, in his work; and Griesinger warns his readers, repeatedly, against what he terms "vulgar therapeutic illusions." The latter counts, especially, the experiments with phosphorus and other agents to "vivify" the brain, and declares that "alcoholics are to be wholly condemned in the treatment of the insane." We can hardly suppose that experiments with chloral and the bromides upon this class, to the extent now practised, would have met his approval.

It may be hoped, then, that the time has come for a more rational treatment of insanity by specialists, as well as by the general profession. Perhaps the next step in reform will be to show that those who, for various purposes of care, security, and treatment, are now all brought together in an asylum, are not all treated with advantage upon a single plan. It will be seen that the small class who really need medical treatment would receive it at their homes, or in small local hospitals, as Griesinger has advised. These hospitals should also afford room for the larger class in whom fatal diseases of the brain, inflammation, softening, etc., are accompanied with insan-

ity. Of the incurable cases, who now make up nine-tenths of the population of our asylums, the large number needing special care might well be divided between local farm asylum or workhouses, and infirmaries. Certainly no sound argument for providing for all who may be termed insane in asylums of a fixed size, style, and mode of administration, can be based upon the doctrine that insanity is a disease.

To bring together, in this way, all cases of acute delirium from alcohol or other poisons, of primary and secondary dementia, of partial mania, and of epilepsy, paralysis, and the various brain-diseases of which mental disorder is a symptom, is, medically speaking, precisely analogous to placing in a hospital for consumptives all who suffer from a single symptom of lung-disease, as cough or emaciation. Nor are the practical objections to such an absurd classification met by proofs of the great curability of insanity, which are based upon the transient character of certain kinds of delirium, and of paroxysms of maniacal excitement. Moreover, it was for the relief of the subjects of insanity proper—i. e., the various forms of mental disorder not associated with bodily disease and which are generally chronic in their mode of invasion and in their duration—that insane asylums were founded. It can not fail to be seen that all their peculiar features of building and organization were designed to afford relief through mental influences brought to bear upon mental states. I believe also that we must still rely mainly upon a sympathy with fellow-beings separated, perhaps permanently, from friends and society, and suffering extreme mental anguish, to sustain these noble institutions. To regard them chiefly as hospitals for the cure of a special form of bodily disease, and to advocate them upon grounds of public economy, is, I fear, to indulge one of those medical delusions which can only end in mischief to the community and to our profession.

But the bad effects of false theories of insanity are perhaps most strikingly exhibited in the testimony of medical witnesses before courts of law. It is owing to the unsound and contradictory views of these witnesses that the plea of insanity has gained its extreme disrepute as the favorite source of crime.

What is a medical diagnosis of insanity? This question would seem not a difficult one to answer. According to the plainest principles of classification, a form of mental disorder must consist exclusively of mental symptoms. The first step in a diagnosis, then, is the discovery of morbid phenomena of this kind through the looks, words, and actions, presented in a given case. The character of these symptoms as morbid, it is to be remarked, depends upon their recognition as subversive of the faculties of the mind. It is not due to their association with signs of bodily disease, or to the supposition that they depend upon some hidden lesion of the brain. They bear in themselves the marks by which they are to be distinguished from natural eccentricities of feeling and behavior, false ideas and beliefs, the frenzy of passion, intoxication, and simulation. These symptoms are next to be classified as belonging to a certain type, whether of exaltation or depression, of delirium, acute or systematic, or of dementia. From a positive diagnosis of mental disorder physical symptoms, then, are excluded, *ex hypothesi*. Nor can they ever be sufficient of themselves to form the basis of a probable diagnosis even. There is no form, and scarcely any degree, of brain-disease, that has not been found consistent with sanity; and, on the other hand, every variety of cerebral lesion has been found in cases of insanity. They can only aid in forming a probable opinion of the morbid character of certain mental facts which have already been discovered to admit of such an interpretation. It is, then, in the study of the mental symptoms, their causes, their development, duration, and severity, that the diagnosis of insanity rests. And here, according to Griesinger and other high authorities, the proper office of the physician ends. For all medical purposes the diagnosis of insanity is full and complete. Legal authorities declare that the legal fact of insanity consists solely in the finding of a jury to that effect. They deny also that legal responsibility is a medical question at all. In like manner, the medical authorities referred to have denied that a loss of moral freedom is embraced in a medical diagnosis. To cite Griesinger again: "Mental disorder and complete loss of liberty are not the same." He also advises the physician not "to intermeddle with matters which

do not belong to his office;" and says that he has himself refused to answer the question of responsibility, as being extra medical.

But a large class of medical writers hold that physical symptoms have an important place in the diagnosis of insanity. The celebrated Dr. Falret even declares that "a mental disease is denoted by physical symptoms, by manifold psychological symptoms, and by a definite order in their succession. Now, this is not only contrary to settled medical principles but it is plainly calculated to render a medical diagnosis more difficult. If we are often at a loss how to classify a case when our categories are made up of mental symptoms alone, it must be nearly impossible to do so when they consist of a double series of symptoms, bodily and mental, and a special history. It is admitted, indeed, by Dr. Falret, that such categories are yet far from being established to meet all cases. He only hopes that this may be done in some not distant future. Meanwhile, as to those cases which cannot be placed in categories now formed, a diagnosis cannot be made. Generally, however, these writers do not seek to form a legitimate medical diagnosis. They are content to speak of both bodily and mental symptoms as affording proofs of insanity, which is for them a condition of irresponsibility, due to disease. I have before said that Dr. Ray, perhaps the most widely-known American authority, speaks of these symptoms together as facts of Nature, and compares conclusions drawn from them to those from sensible facts. It should be noted, however, that in his philosophy the mental and the physical belong to the same order of phenomena. Dr. Nichols, of Washington, also a well-known expert, rests his medico-legal diagnosis upon both physical and mental symptoms, considered as distinct categories. Of the former class he designated, in the case of Mary Harris, emaciation, frequent pulse, and insensibility to cold. Another distinguished expert in this country has lately given to physical signs the highest importance in his diagnosis. I refer to Dr. Hammond, of New York, by whom the aesthesiometer, the dynamograph, and the sphygmograph, were used to test the insanity of McFarland. I could name many other authorities who, however else they may differ, agree

ing their diagnosis one of irresponsibility rather than of disease, while yet founding it, in great part, upon the bodily symptoms. The first effect of this incongruous scheme is to thrust the witness out of his proper sphere of medicine and place him in opposition to legal doctrines. And here he is unable to explain the first step of the process by which a series of symptoms, mental or bodily, or both, is made to prove a loss of moral freedom. The attempt to do this has never failed, I believe, to illustrate a very common fallacy of reasoning. Never disguised, the argument finally resolves itself into

Insanity is disease. Insanity is also irresponsibility. Therefore, disease is irresponsibility. It is, in fact, this constant use of the word disease which has tempted medical men to base their diagnosis of insanity in part upon bodily symptoms. That, like insanity, it is a term representing neither a real existence nor a definite idea, and that, meaning a bodily disorder, a sense both technically and practically has been forced upon it, I have already shown. Let me make, then, by inquiring what are the nature and true value of expert testimony where it assumes to decide the question of irresponsibility.

In the first place, as I have already proved, the data from which the expert infers a state of irresponsibility must consist in every slightest degree only of physical facts. When Dr. Ray says that he finds insanity where others do not, because a secret of Nature has been disclosed to him, which was denied from them, I cannot help believing him profoundly mistaken. Dr. Ordonaux is doubtless right in holding that it is the quality of the judgment, rather than the discovery of new facts, which gives its value to expert testimony. Yet he seems to mistake the nature of the facts in question, and the action of the judgment in respect to them. Between uncertainty and the fallibility of the senses, there can be no parallel. Sensible facts can be repeated at will under the same or different conditions, and subject to the test of all the senses. Moreover, the judgment acts upon them within the sphere of consciousness, and by steps that admit of demonstration to other minds. But the facts from which a loss of freedom is inferred are almost purely mental, the decisions of the

judgment upon them are reached unconsciously, and there is no method whatever of testing their validity. A truly scientific opinion, then, upon the question of insanity, is impossible in the nature of things. The medical witness is neither able to connect his opinion with physical facts, nor to establish it as a conclusion from logical premises. Let me say again, that the loss of the free will in any case can only be known to him as a judgment which arises instinctively in his mind. As he can give no intelligible account to others of the facts upon which it is based, so he can give none to himself of the processes by which it is formed. Of course, all attempts to justify such a judgment by facts, or by reasoning, can only result in his complete discomfiture upon a skilful cross-examination. Is, then, the opinion of experts in cases of insanity worthless? On the contrary, when the skilled witness is in full possession of the facts, his unbiassed judgment must always be of the greatest value. As this judgment is based upon analogies perceived between these facts and those already stored in the mind, and as the expert has usually had much more experience of the insane than of criminals, it will, almost of necessity, lean to the side of irresponsibility. Yet it will not be difficult to make due allowance for this tendency. It is the presence in the mind of the witness of false ideas respecting the nature and certainty of the evidence before him that so often renders his opinions false and misleading. We are obliged to confess that our judgments of sensible facts and the plainest propositions often reflect nothing but previous assumptions or present states of feeling. How absolutely necessary, then, that the mind should be free from absurd theories and personal prejudices, when the facts before it are metaphysical, and its processes concealed from consciousness! It is to test this that the cross-examination of an expert should be chiefly directed; and while it reveals as many false facts and unsound arguments in his testimony as can be found in the plea of an advocate, it will doubtless continue to be permitted. Much indeed, may be done by the courts to protect a judgment which must always be easily swerved from the influence of external circumstances. But, after all, its value will mainly depend upon the mind of the witness himself, and especially

on its freedom from false conceptions of the nature of insanity and its relations to medicine.

1. IV.—*A Letter to the Editor on some Recent Contributions to Mental Science, Medical Jurisprudence, and Anthropology.* Being the second of the series. By GEORGE EDWARD DAY, M. D., F. R. S., late Professor of Medicine in the University of St. Andrews, etc.

I CANNOT begin this letter better than with a notice of the Hergillian Prize Essay for 1870, which has been awarded Dr. Clouston, Superintendent of the Cumberland and Westland Asylum, for an essay entitled "Observations and Experiments on the Use of Opium, Bromide of Potassium, Cannabis Indica, in Insanity, especially in regard to the effects of the two latter given together." The main object of the author was to ascertain the effects of these medicines on morbidly-excited patients. His experiments are divided into two sets: first, those made on incurable patients in whom morbid brain-excitement existed; and, secondly, clinical observations on the effects of the same medicines on recent and amenable cases of excitement. The author first investigates the effects of single doses, and subsequently the effects of long-continued courses of the medicine.

To ascertain the effects of *single doses*, he selected eight patients (four men and four women) laboring under great excitement. Different drugs were given to each on successive days, "till all had been gone over, when I began again, repeating the experiments four times with most of the substances used." In this way he gave them drachm-doses of tincture of opium, drachm and two-drachm doses of bromide of potassium, drachm-doses of tincture of cannabis Indica (British Pharmacopoeia), and a mixture of a drachm each of the last two. Moreover, instead of medicine, each patient had on one day four ounces of good whiskey, and on another a pint of coffee made from a pound of meat.

The effect of single doses of these substances on (1) the

excitement, (2) the appetite, (3) the temperature, and (4) pulse, was carefully observed. In allaying excitement, the combination of bromide of potassium and tincture of Indian hemp was serviceable in the largest number of cases, and its effects were the most lasting. It acted beneficially in ninety per cent. of the experiments. Opium was next in potency, good effects being seen in sixty-six per cent. of the cases. The bromide alone allayed excitement in about fifty per cent. The whiskey was serviceable in about seventy-five, as many cases as the opium, but the beef-tea had no marked action. The effect of a drug on *the appetite* is very important, and in this respect opium has a bad preëminence. In seven out of twenty-nine experiments with it, the patients would not touch the next meal. This was never the case after bromide of potassium, and once after its combination with Indian hemp. With regard to *temperature*, the tendency of opium was to raise it slightly; that of bromide of potassium and Indian hemp combined, to depress it; and that of the bromide alone, to raise it rather more than opium; that of Indian hemp alone, to raise it very slightly; that of whiskey, to lower it most of all; and that of beef-tea, very slightly to depress it. The effect of the various drugs on the *pulse* was as follows: The bromide combined with Indian hemp caused an average increase of eleven beats, and that of the latter alone of six beats; while the bromide given alone causes a fall of four beats: hence, why the latter should strengthen the accelerated action of the Indian hemp is not clear. Opium, whiskey, and beef-tea, had no decided action.

Taking all the effects of these medicines into account, the balance of good is decidedly on the side of the mixture of the bromide and the Indian hemp.

Dr. Clouston thinks that, with regard to their sedative effects, no single dose of bromide of potassium up to ten drachms will be at all equal to one drachm of tincture of opium, if there is much excitement; but, to produce sleep in milder cases, one drachm of the bromide will have the same effect as half a drachm of laudanum or two drachms of tincture of henbane.

The effect of the sedatives, when given regularly for long

periods, is next considered. The author began with *opium*, which he gave continuously in increasing doses for a length of time to nine chronic maniacs, all laboring under great excitement of long duration. For a month they were weighed every week, and the morning and evening temperature and pulse were noted. Then for twelve weeks they went through a course of laudanum. For the first two weeks they took twenty-five minims three times a day, and for the next two weeks a drachm three times a day, and for the next eight weeks a drachm and a half three times daily. Two of the nine patients were rendered so ill by the drug that the experiment was virtually restricted to seven. The *excitement* was not at all affected by the twenty-five minim doses, nor was there any change in their appetites, weights, temperatures, or pulses. The drachm-doses caused a partial diminution of excitement, and in three there was decided drowsiness. Five began to lose weight, and in almost all there was a slight fall in the temperature. When the dose was raised to a drachm and a half, the excitement was decidedly lessened or altogether overcome, but in three of the cases the effect was not lasting. In taking the larger doses they all lost *weight*, the greatest loss being thirteen pounds, and the least one pound. The fall of *temperature* varied in the morning observation from 1° Fahr. to 0.1° , and in the evening from 0.5° to 0.1° . The morning *pulse* was hardly affected, but the evening pulse was reduced by nine beats.

At the same time of the following year, these same patients went through a continuous course of a mixture of bromide of potassium and Indian hemp. They were first placed on half-drachm doses of each thrice a day for a month. The dose was then increased to forty-five grains of the bromide and forty-five minims of the tincture of Indian hemp, for a fortnight, and this dose had so decided a sedative effect that except in one or two cases he did not venture to exceed it. He then reduced the dose to half a drachm of each, and this treatment was found so beneficial that he continued it for eight months. Without going into details, it is sufficient to state that, if we compare this mode of treatment with the opium-treatment, it is clear that the former (in half-drachm doses of

the two drugs) presents the maximum of good effects, and a minimum of those that are deleterious. The first part of the essay, which is published in the *British and Foreign Medical and Chirurgical Review* for last October, concludes with the author's observations on the effects of bromide of potassium alone in large doses, but, if I am not mistaken, I noticed his remarks on this subject (as published in the *Journal of Mental Science*) in my last letter.

The second and concluding part of Dr. Clouston's essay published in the January number of the same Review, consists mainly of "Clinical Observations," which do not admit of condensation, and concludes with a general summary of his labors.

He began using bromide of potassium in the early part of 1868, and has prescribed it, either alone or with Indian hemp in fifty-one cases of various forms of insanity. In acute mania, the bromide alone, in all doses up to 120 grains three times a day, had no perceptible effect, but, when combined with the tincture of hemp, the influence was often very remarkable, the good effects appearing within a day. The form of insanity to which the bromide or the previous mixture did most good were puerperal mania and that mild form of insanity which often appears at the change of life. In ordinary melancholia these medicines were less serviceable, and indeed the mixture seemed to do harm. The last form in which he tried the bromide and the mixture was general paralysis, and as might be expected, he got only palliative effects. A good palliative, however, in the early stage of this disease, when there is great excitement, is of value, and Dr. Clouston, after trying opium, henbane, Indian hemp alone, and bromide of potassium alone, found the mixture of the two latter, in doses of from half a drachm to a drachm of the bromide with a drachm to a drachm and a half of the tincture of Indian hemp, to be the best remedy.

Dr. Clouston's essay is the result of a large mass of experiments and observations, and well deserves the Fothergill's gold medal.

In the section on insanity in Dr. B. W. Richardson's "Report on Toxicology, Forensic Medicine, and Hygiene," the

is nothing beyond a brief notice of the McFarland case, and an abstract of a paper by Drs. Rogers and Brown, "On Fractured Ribs in Insane Patients." The subject is one of great practical importance, because fractured ribs, discovered either during life or after death, are of frequent occurrence in asylums, and are always ascribed to acts of undue violence on the part of the attendants. Several specimens of ribs of general paralytics were sent to the Liverpool School of Medicine for analysis. The analytical results show that "the ratio of organic constituents to earthy matter is much greater, while the ratio of lime to phosphoric acid is distinctly less, in the ribs of paralytics than in those of healthy adults; and generally the composition of the bones in cases of paralysis approaches that observed in cases of osteomalacia." These results, so far as they go, tend very materially to explain the frequency of fractured ribs in the insane.

There are two articles on this subject in the January number of the *Journal of Mental Science*, namely, one by Dr. Hearder, of the County Asylum, Carmarthen, and one by Dr. Ormerod (reprinted from the St. Bartholomew's Hospital Reports). From the former paper we learn that, in the course of examining twenty bodies of patients in the Carmarthen Asylum, it was found that in nine the ribs were so abnormally soft and fragile that Dr. Hearder wonders that "such a state of the bones should have existed in persons who were often excited and violent in their actions, without the occurrence of fractures." Dr. Latham, in his "Observations on the Peculiar Condition of the Bones of two Insane Patients who had Fractured Ribs," points out, by microscopic aid, that the brittleness of the ribs depends on a morbid condition of the bones generally, which more specially affects the ribs than other bones. The process is one of absorption of the internal structure, the osseous tissue being replaced by an excessive deposit of the fatty matter normally existing in the interior. He appends to his paper an account of two cases described by Dr. Williams in the *Lancet* of September 3, 1870.

The other original articles in the current number of the journal are the following: Dr. Lockhart Robertson, "On the

Alleged Increase of Insanity," which he shows to be a popular delusion; Dr. Lauder Lindsay, "The Family System: applied to the Treatment of the Chronic Insane," in which he advocates the reproduction of a Gheel colony in Scotland (Arran, for example); Dr. Sibbald, "On Clinical Instruction in Insanity," in which he shows what is done and how much more there is left undone in this respect in the leading British, Continental, and American schools of medicine (in connection with the last-named schools he observes that "the most significant indication of Transatlantic progress is the establishment of a chair of 'Diseases of the Mind and Nervous System' at the Bellevue Hospital Medical College, to which Dr. William A. Hammond has been appointed"); while Dr. Tuke continues his "Illustrations of the Influence of the Mind on the Body;" and Mr. Kesteven gives us "The Microscopical Anatomy of the Brain and Spinal Cord in a Case of Imbecility associated with Duchesne's Paralysis."

Dr. Druitt is bringing out in the *Medical Times and Gazette* a series of very instructive articles under the title of "Clinical Notes of the Varieties of Imperfect Speech produced by Brain-Disease," to which I may again advert when they are further advanced. Dr. Eastwood has published in the *British Medical Journal* a paper "On Intemperance in its Medical and Social Aspects," which he read before the Public Medicine Section at the last meeting of the British Medical Association. He deals with the subject of drunkenness in its relation to insanity, crime, and pauperism. He regards it as capable of giving rise to any of the following forms of insanity:

1. Acute mania of a noisy and destructive kind.
2. Delirium tremens; the two together forming, with drunkenness itself, what has been called acute alcoholism.
3. Dipsomania, or an irresistible impulse to drink alcoholics.
4. Dementia, with gradual loss of memory and energy and diminution of muscular force.
5. Chronic alcoholism, to which degeneracy of the individual is the characteristic result of intemperance.

6. General paralysis of the insane.

7. Other forms of insanity, acute and chronic.

The author proceeds to show that, except in the case of dipsomania, there is seldom any difficulty in obtaining the proper certificates for sending a patient to an asylum, and to explain Mr. Dalrymple's proposed bill "to provide for the Management of Habitual Drunkards," which will enable dipsomaniacs to be properly cared for in refuges, etc., even when their symptoms are not such as to bring them under the definition of being of unsound mind. I shall send you a copy of the amended bill as soon as it is printed.

Dr. Laycock, of Edinburgh, is publishing a course of lectures "On the Clinical Observation of Diseases of the Brain and Nervous System," which are deserving of much attention, and occupy a prominent place in the new volume of the *Medical Times and Gazette*. Passing over the first lecture, which is mainly introductory, we find the second devoted to the explanation and application of what he terms "the law of direction of physiological activity," which also indicates the direction of structural degeneration. As the late Dr. Waller demonstrated it to be the law of degeneration of both the motor and sensory spinal nerves, Prof. Laycock, who has extended its application to the brain and nerves of special sense, has named it the "Wallerian law." "An injury," he observes, 'to a sensory or afferent nerve may be followed by varying centric disorder and disease. In traumatic tetanus, the spinal trophic system of the flexor and extensor muscles of the lower jaw, limbs, and trunk, is so affected that tonic convulsions follow upon a slight touch, or even change of temperature; or, the injury may cause a neuralgia and no tetanus, but spasms and epileptic convulsions; or, there may be no neuralgia, only illusive sensations, as an aura, numbness, and yet centric encephalic disorders result; or, there may be no change perceptible by the patient, and yet there may be various vesaniæ, such as the so-called 'masked' epilepsy, mania, melancholia. I give you as an illustration an instructive railway case. On March 24, 1866, a house-agent and tax-collector, aged sixty, weighing 308 lbs., was holding on to a railway-carriage, when the guard crushed the end of his

finger by shutting the door, so that a portion was squeezed. He suffered much from pain and loss of blood, and reached home faint and exhausted. The finger healed, but in course of a month after the injury he had a slight tetanic symptom, and in a few days after that a sort of fit. He complained, also, of numbness and strange sensations in hand and arm, twitchings of the face, and a sense of weakness and loss of strength, so that, although previously robust health, he was unable to undergo even slight exertion without a feeling of fatigue. He resumed his office-work for six months, but got slowly worse, becoming highly nervous and dreadfully depressed. He had next numbness of the body and faintness; then, by degrees, his powers of speech, motion, and vision failed; and at last he died, September 13, 1867, nearly eighteen months after the accident. This is one of the many kinds of injuries to the nervous system railway accidents cause. What was the probable pathological anatomy? First, degeneration of the afferent fibril of the injured finger; then of the intervertebral ganglion; and radiation thence, either upon other ganglia, including the cervical, or else upon the sensory structures of the cord; and as a sequel, degeneration either of the vessels, or lymphatic or connective tissue, or of all, so that the functions of both sensory and motor sides of the cerebro-spinal centres were abolished. The progressive disease, the age, and the weight of the sufferer, lead to the inference that the degenerative changes were diathetic.

"The element of time is a very important point in diagnosis and prognosis of this class of cases. The progressive degeneration may extend over several years. In July, 1861, I saw a captain in the Royal Navy, who, fifteen years before, when a midshipman, fell about eight feet as he was descending Table Mountain, Cape of Good Hope. He received a scalp-wound, which bled freely, and he thought he must have been made unconscious. The surgeon of his ship examined him but found no fracture, and dressed the wound, which he did well. I found an extensive scar on the scalp, over the crest of the left parietal region, and the surface slightly depressed. This had led some to propose trephining. Twelve years after

the injury he married, and shortly after had habitual headaches, with mental depression, increasing until he became melancholic. Rest from active duty restored him to comparative health of both body and mind, but his manner continued peculiar. He, however, resumed charge of a ship, and so got involved in harassing and anxious night-duties off the Irish coast, watching the Fenians. This exhausting work induced a series of neuroses of the encephalon, which were progressively intensified into structural disease, until (when I saw him) he was weak of mind, incapable of movement, passed urine and faeces involuntarily, and had great difficulty of articulation, as well as an incapacity to express his ideas by appropriate words, although he easily smiled and laughed. Early in November of the following year he had successive fits of convulsions, became unconscious, and so died, sixteen years after the injury to the scalp. Long as this period may appear, I knew a major whose insanity was attributed, and I believe rightly, to a scalp-wound (sabre-cut) received at the battle of Waterloo, thirty years previously.

"The relation of these exciting and predisposing causes to time—and long time—is one of the most important points in the observations of diseases of the nervous system. It meets you everywhere."

After some general remarks on the independence of the two hemispheres, and on the generally-admitted fact that structural disease is more common in the left hemisphere than in the right, he proceeds to apply the Wallerian law of degeneration to the subject of aphasia: "From this point of view, the causes of left lesions in aphasia are very various: 1. Greater use, both motor and sensory, is one very common cause; but motor use alone cannot influence tongue-speech unilaterally in the same way as it influences hand-speech, because the muscles on both sides must be used in tongue-speech, and we can only infer, therefore, that the left side is more used mentally; but this is not proven. It is different in hand-speech, in which one arm and hand is much more commonly used than the other to express emotionally and volitionally all ideas and feelings. The greater motor use of the right arm probably predisposes the left half to degenera-

tion as to its motor structures, while the mental—that is, sensorial—use to this end will also, in like manner, predispose more ready degeneration of the orbital lobes. Such degeneration would involve, also, the sensorial structures (orbital lobe subservient to tongue-speech, but these two kinds can and occur separately. 2. The nutrition of the convolutions depends greatly upon the supply of blood through the middle cerebral artery; and, as the left common carotid comes directly from the arch of the aorta, it is more directly liable to take in fibrin-plugs than the right, and hence embolism of the middle cerebral artery, with consequent hemiplegia and aphasia, is more common than of the left. 3. Reflex causes of defective nutrition are also more common on the left than on the right half of the axis. Thus, the heart and large vessels act more commonly in this way on the left half than the liver on the right. 4. The kidneys, ovaria, and testes exercise when diseased, an important diastaltic influence on the nutrition of the brain and cord, and, as the left kidney and testis are more predisposed to disease than the right, because the veins are more liable to pressure, the left half of the cerebral spinal axis is more likely to suffer than the right. This is true, even although their action be decussative as regards the cerebellum, for disease of that organ is decussative as regards the cerebrum; so that atrophy of the *right* half of the cerebellum from disease of the *left* testicle would react on the *left* hemisphere. For these and other reasons, deep down in development, it happens that nerve centres and organs on the left side are more frequently affected from diastaltic action of these organs than on the right.”

Passing over his remarks on changes in the appearance of the pupil (with the remark that its contraction means paleness and redness and congestion of the face and conjunctivæ diagnostic signs, we come to the subject of headaches. “The significance of headaches varies as widely as their causes, and as the tissues involved. Some are due to extra-cranial causes as osteosis of the cranium and dura mater, syphilitic periostitis of the cranium, disease of the internal ear, tumor of the dura mater, neuralgic and rheumatic affections of the scalp. In these cases the pain, as headache, is usual

localized, or at the most is hemi-cranial. On the other hand, cerebral or brain aches are more general; yet these affect regions. You will find it useful to inquire whether the headache of this kind be frontal, coronal, occipital, or general. Frontal headaches, except when associated with signs of hemiplegia, aphasia, and simple palsies, are for the most part symptomatic. They are very common in gastric and hepatic disorders; in almost all exanthematic, epidemic, and endemic fevers, and in fever generally. Coronal headaches have their seat in the vertex, are often conjoined with increased heat of the part, and a falling of the hair, and commonly indicate a neurosis. They are experienced in hysteria, nervousness, and low spirits, melancholia, paroxysmal and other kinds of insanity. In one case of paroxysmal insanity that came under my notice in consultation, there was found after death an adhesion of the dura mater to the cranium and pia mater at the point of the vertex to which pain was referred. Occipital headache is of two kinds: one kind, associated with pain extending down the nape, and either with a tendency to throw the head back, or with actual spasmodic contraction of the cervical muscles, is one of the most pathognomonic signs of cerebral meningitis of the base, extending down the cord. It is, as such, a common initiatory symptom of that cerebro-spinal meningitis which has been observed of late in Ireland, and in which the occurrence of a neurotic purpura in certain cases, the result of the spinal lesion, has caused it to be named the 'black fever' or the 'purples.' The other kind of occipital headache is wholly different. It is usually a sign of chronic disease of the cerebellum, or of the dura mater over it, but, it is also a neurosis like the coronal headache.

"In certain head-affections, chiefly neuroses, the patient complains of painful sensations, which are illusive, or, as some would say, imaginary, and of which the seat is in the muscle-sensory tract at the base of the brain. Often with coronal headache there is a feeling of pressure at the vertex, in others the head feels as if a hoop were fixed round it, resembling a like sensation round the trunk, experienced in certain kinds of paraplegia. These and others, of burning, boring, tearing, etc., belong to a group of corporeal illusive sensations, referred to

the bones, limbs, and viscera, which the patient cannot easily describe, but which are very common in sexual hypochondriasis, delirium tremens, and insanity. The 'splitting' headache of fevers belongs to this class."

I shall resume the consideration of these lectures, of which only two have yet appeared, in my next letter.

Under the title of "Body and Mind," Dr. Maudsley has published the Gulstonian Lectures which he delivered last year before the Royal College of Physicians. The volume consists of three lectures: 1. On the physical condition of mental function in health; 2. On certain forms of degeneracy of mind, the causation and their relations to other disorders of the nervous system; and 3. On the relations of morbid bodily states to disordered mental functions, with an appendix containing two previously printed papers: "On the Limits of Philosophical Inquiry," and "On the Theory of Vitality." In his first lecture he gives a general survey of the physiology of our mental functions, showing how indissolubly they are bound up with the bodily functions; and points out that the higher mental operations are functions of the supreme nerve-centres, but that though of a higher and more complex nature than the functions of the lower nerve-centres, they obey the same physiological laws of evolution, and can be best approached through a knowledge of them.

In the second lecture he shows how large a part in the production of insanity is played by the hereditary nervous system and points out the necessity of scrutinizing more closely than has yet been done the features of the different forms of mental derangement that owe their baneful influence. The following extracts from this lecture on the subject of idiocy will not, I think, be deemed undeserving of a place in this letter.

"The congenital idiot is deprived of his human birthright for he is born with such a defect of brain that he cannot display any, or can only display very feeble and imperfect, mental functions. From no fault of his own is he thus afflicted, seeing that he must be held innocent of all offences—but of the offence of his share of the original sin; but it is nowise so clear that it is not from some fault of his parents. It is all too true that, in many cases, there has observably been a neglect or d

regard of the laws which govern human development through the ages. Idiocy is, indeed, a manufactured article; and, although we are not always able to tell how it is manufactured, still its important causes are known and are within control. Many cases are distinctly traceable to parental intemperance and excess. Out of three hundred idiots in Massachusetts, Dr. Howe found as many as one hundred and forty-five to be the offspring of intemperate parents; and there are numerous scattered observations which prove that chronic alcoholism in the parent may directly occasion idiocy in the child. I think, too, that there is no reasonable question of the ill effects of marriages of consanguinity; that their tendency is to produce degeneracy of the race, and idiocy as the extremest form of such degeneracy. I do not say that *all* the children of such marriages may not sometimes be healthy, and *some* of them quite healthy at other times; but the general and ultimate result of breeding in and in is to produce barrenness and sterility, children of a low degree of viability and of imperfect mental and physical development, deaf-mutism, and actual imbecility or idiocy. Again, insanity in the parent may issue in idiocy in the offspring, which is, so to speak, the natural term of mental degeneracy when it goes on unchecked through generations. It may be affirmed with no little confidence, that, if the experiment of intermarrying insane persons for two or three generations were tried, the result would be sterile idiocy and extinction of the family" (pp. 44-48).

"No one," he justly observes, "can well dispute that, in the case of such extreme morbid variety as a congenital idiot is, we have to do with a defective nervous organization. We are still, however, without more than a very few exact descriptions of the brains of idiots. Mr. Marshall has recently examined and described the brains of two idiots of European descent. He found the convolutions to be fewer in number, individually less complex, broader and smoother, than in the apes: 'In this respect,' he says, 'the idiot's brains are even more simple than that of the gibbon, and approach that of the baboon.' The condition was then the result neither of atrophy nor of mere arrest of growth, but consisted essentially in an imperfect evolution of the cerebral hemispheres or their parts, dependent

on an arrest of development. The proportion of the weight of brain to that of body was extraordinarily diminished. We learn, then, that when man is born with a brain no higher—indeed lower—than that of an ape, he may have the convolutions fewer in number, and individually less complex than those are in the brain of a chimpanzee and an orang; the human brain may revert to, or fall below, that type of development from which, if the theory of Darwin be true, it has gradually ascended by evolution through the ages. With the defective organ there is a corresponding defect of function. But this is sometimes more than a simple defect. A curious and interesting fact, which has by no means yet received the consideration which it deserves, is that, with the appearance of the animal type of brain in idiocy, there do sometimes appear and reappear remarkable animal traits and instincts. There is a class of idiots which may justly be designated *theroid*, so that brutes are the members of it" (pp. 46, 47).

A striking instance of this kind is described by Dr. Mitchell, Deputy Commissioner in Lunacy for Scotland: "I have never," he says, "seen a better illustration of the ape-faced idiot than in this case. It is not, however, the face alone that is ape-like. He grins, chatters, and screams like a monkey, never attempting a sound in any way resembling a word. He puts himself in the most ape-like attitude in his hunts for lice, and often brings his mouth to help his hands. He grasps what he brings to his mouth with an apish hold. His thumbs are but additional fingers. He has a leaping walk. He has heavy eyebrows and short hair on his cheeks or face. His brain is not very small, its greatest circumference being two inches and a half, but in shape it strongly exhibits the form of abnormality."

After describing Pinel's case of an idiot who was so stupid as to be like a sheep, both in respect of her tastes, her mode of life, and the form of her head, who used to butt with her head if she was in a passion, who slept on the ground in the posture of animals, whose back, loins, and shoulders, were covered with hair, and whose speech was confined to the words, *bé, bah!* he proceeds to give the details of a deformed idiot now in the West Riding Asylum, who has striking features

resemblance to a goose, so much so that the nurses who received her described her as just like "a plucked goose." Her father died in the asylum, and her mother's sister was also a patient in it at one time. She is four feet two inches in height, has a small head and thin and scanty hair, so that the crown of the head is partially bald. The eyes are large, round, prominent, and restless, and are frequently covered by the eyelids, as if by a slow forcible effort at winking. The lower jaw is large, projecting more than one inch beyond the contracted upper jaw, and possesses an extraordinary range of antero-posterior, as well as lateral movement; the whole configuration of the lower part of the face having a somewhat bill-like appearance. The neck is unusually long and flexible, and is capable of being bent backward so as to actually touch the back between the scapulæ. The cutis anserina is general over the body, but is most marked on the back and dorsal aspect of the limbs, where it looks exactly as if it had been just deprived of feathers. The inferior angles of the scapulæ stand prominently out, and, moving freely with the movements of the arms, have precisely the appearance of rudimentary wings. The girl utters no articulate sounds, but expresses pleasure by cackling like a goose, and displeasure by hissing or screeching like a goose, or perhaps like a macaw. When angry, she flaps her arms against her sides, and beats her feet upon the floor. She knows her own name, and understands one or two short sentences, such as "Come here," and "Put out your hand." She recognizes the persons who attend upon her and feed her, and is much agitated if touched by a stranger. She cannot feed herself, but swallows voraciously all that is put into her mouth, showing no preference for one article of diet over another. She is dirty in her habits, and no amount of attention has improved her in this respect. She is very fond of her bath, cackling when she is put into it, and screeching when she is taken out of it:

"It is a natural question," says the writer, "whence come these animal traits and instincts in man? Instead of passing them by as abnormal, or, worse still, stigmatizing them as unnatural, it behooves us to seek for the scientific interpretation which they must certainly have. When we reflect that every

human brain does, in the course of its development, pass through the same stages as the brains of other vertebrate animals, and that its transitional states resemble the permanent forms of their brains; and, when we reflect further, that the stages of its development in the womb may be considered the 'abstract and brief chronicle' of a series of developments that have gone on through countless ages in Nature, it does not seem so wonderful, as at the first blush it might do, that it should, when in a condition of arrested development, sometimes display animal instincts. Summing up, as it were, itself the leading forms of the vertebrate type, there is truly a brute brain within the man's; and when the latter stops short of its characteristic development as *human*, when it remains arrested at or below the level of an orang's brain, it may be presumed that it will manifest its most primitive functions and no higher functions" (p. 52).

"We need not," he adds, "confine our attention to idiocy only. Whence come the savage snarl, the destructive disposition, the wild howl, and the offensive habits, so often displayed by the insane? The numerous brute-like characteristics (including bolting the food and rumination) that are at times witnessed in the insane show that morbid psychology may yield some very strong facts and arguments in support of Mr Darwin's views."

Among other points of importance discussed in this lecture are "the bodily and mental marks of the insane temperament (see page 62, etc.), and the subject of that most distressing form of insanity in which there is a desperate impulse to commit suicide or homicide (see page 72).

Among the subjects treated of in the concluding lecture are sexual insanity, in all its forms, sympathetic insanity, hallucinations, tentacles of the insane, delirium of exhaustion and idiopathic insanity.

If I am not much mistaken, this interesting volume will soon be reprinted by some enterprising American publisher.

Another book to which I would direct the attention of the readers of this letter is "The Prophetic Spirit in its Relation to Wisdom and Madness," by the Rev. A. Clissold, M. A., a well-known Swedenborgian. In this very remarkable and,

many minds, startling volume, Mr. Clissold maintains that the prophetic spirit is resolved, by recent medico-psychological inquiries, into hallucinations, illusions, and other symptoms of disordered ideation. He first treats of the state called the *prophetic mania*; secondly, he compares its phenomena with those of *mystics*, false prophets, and the insane; thirdly, he points out the modern psychological explanation of these phenomena; fourthly, he sets forth the intrinsic differences between prophetic and morbid mania; and, lastly, he suggests what he considers to be the first principles of a higher psychology. Nearly half the book, which consists of more than three hundred pages, is devoted to the intrinsic differences between prophetic and morbid mania. The true prophets were in communication with supernatural beings by *internal voices*, which were of supernatural origin, whereas the *internal voices* of the insane may be accounted for by merely natural causes. These internal voices are, if I am not mistaken, a part of Swedenborgian belief.

The perusal of Dr. Meredith Clymer's very interesting paper "On the Dramatic Diseases of the Nervous System" led me to write to Dr. Lefebvre, Professor of General Pathology and Therapeutics in the Catholic University of Louvain, to ask for further and later details regarding the case of Louise Lateau. In reply to my letter, he forwarded me a complete work, which he has recently published, entitled "*Louise Lateau. de Bois d'Hainc: sa Vie—ses Extases—ses Stigmata. Étude Médicale. Par le Dr. F. Lefebvre. Pp. 360. Louvain, 1870.*" The mode of arrangement of the volume is as follows: In the first part he gives a short biography of the young woman; in the second, he enters into the details of her case, in the third, he discusses the hypothesis of there being any fraud or imposition practised; while the fourth and concluding part, which occupies more than three-quarters of the whole book, is devoted to the medical study of the facts. He devotes eighty pages to the subject of stigmatization, and a hundred to that of ecstasy. The author of this curious volume is deserving of the highest praise for the conscientious care with which he has investigated this almost incredible case. I may conclude by stating that he informs

me that he last saw his patient on the 13th of January, 1871, and that she continued in precisely the same state (*toujours la même*).

In my next letter I shall notice Dr. Blandford's "Insanity and its Treatment: Lectures on the Treatment, Medical and Legal, of Insane Patients," which has just appeared.

I have scarcely any thing to report on the subject of *Medical Jurisprudence*. The greater part of Dr. Richardson's *Report on the Progress of Toxicology*, in the January number of the *Medico-Chirurgical Review*, is made up of an almost complete reprint of Dr. John Day's paper "On the Color-Tests for Blood and Pus," from the *Australian Medical Journal*. I may state that my brother's blood-test has succeeded when even the spectroscope, in the hands of one of its greatest masters, Mr. Sorby, has failed to give certain evidence; and, as an illustration of the delicacy of the pus-test, I may mention the following case: A woman with an obscure tumor in the hepatic region came from Ballarat to Geelong (where Dr. John Day resides) for advice. A grooved needle was inserted into the swelling by one of the hospital-surgeons and the contents of the groove gave no result under the microscope. On the following day, it occurred to my brother's mind to apply the test to the needle, and it even then yielded a distinct reaction of pus.

It is worthy of being put on record that certain monkeys are insusceptible to the action of strychnia. Dr. Renger states (in the *Indian Medical Gazette*) that the following facts have been ascertained: 1. That the "lungoor" may be said to be proof against the poison of this alkaloid. 2. That the "pouch-cheek" monkey is susceptible, but not so readily as man. 3. That the proverb that a monkey will never eat any thing that is poisonous is confirmed; the "lungoor" readily eating it, while the "pouch-cheek" monkey refused to take it except on compulsion.

A novel method of treatment in cases of poisoning with strychnia has just been published by Dr. Eames, the Superintendent of the Donegal Lunatic Asylum, Ireland, in the *British Medical Journal* for November 12th. While walking in the country, some years ago, he saw a dog suspended

by the hind-legs to the branch of a tree. On asking the owner, who was present, why the dog was placed in this position, he was told that the animal had swallowed vermin-poison, and that this was the proper mode of treatment, the dog having first had a large dose of butter administered. The owner added that he had previously saved the same dog's life by this treatment. A terrier bitch belonging to Dr. Eames having lately taken some strychnia laid for rats, and being in a moribund state, with the most violent tetanic spasms, was submitted to this treatment. He immediately poured about half a pint of sweet-oil down her throat (which under the circumstances must have been no easy matter), and had her tied up to a beam by her hind legs for about six hours, during which period she was occasionally taken down for a few minutes, when the spasms returned. At the end of the six hours symptoms of recovery appeared, and on the next day she was quite well.

The writer believes that the success of the treatment is due to the cerebral congestion produced by the position, the oil or butter only acting mechanically in hindering further absorption. He suggests that by means of a rotating inclined plane, the human subject might be similarly treated; but, if a terrier requires half a pint of oil, what is the dose for a muscular Christian?

Dr. Weyrich has lately published a remarkable case of detection of strychnia, when opium and ipecacuanha had also been taken. The strychnia was detected in an alcoholic extract of the contents of the stomach by means of the reaction produced by strong sulphuric acid and bichromate of potash, which, at first, oxidizes only the emetine, and, this having been removed, produces the well-known purple coloration due to the reaction of these agents on strychnia. The morphia was detected in a separately-made amyl-alcoholic solution by means of molybdate of soda dissolved in sulphuric acid.

A case of death from the absorption of arsenic lately occurred at Derby. An inn-keeper purchased a quantity of arsenic for the purpose of washing the walls of his house, which abounded in bugs. All the family were seized with

symptoms of arsenical poisoning, from which, however, they slowly recovered, excepting the landlord.

The last volume of the *St. Bartholomew's Hospital Reports* contains a short paper by Dr. Legge, entitled "Observations on the Physiological Action of Apocodeia and of the Hydrochlorate of Cotarnamic Acid." The late Dr. Matthiessen placed at his disposal preparations of chloride of apocodeia (a base procured by the action of zinc chloride on codeia) and of hydrochlorate of cotarnamic acid. The former, when given in doses of two or three grains to a healthy man produced no appreciable result; nor had it any effect in stopping intermittent fever when given in two-grain doses before the attack. It is a salt of remarkable bitterness, and is too irritating to be employed for subcutaneous injection. One, two, or three grains injected into a dog caused vomiting in from five to ten minutes, but, when four or five grains were injected, death occurred in about twenty-four hours, intense coma supervening.

The hydrochlorate of cotarnamic acid is an active poison, and is very remarkable for the length of time in which it apparently lies dormant in the system (especially in dogs). Thus, in two dogs, into which 2.1 and 2.76 grains were injected, death occurred three days after the operation, no symptoms having been produced until more than twenty-four hours after the injection. The first symptoms were flickering contractions of the muscles, then great weakness and inability to stand; the cause of death probably being the weakness of the diaphragm and other respiratory muscles, the action of the heart remaining unimpaired. Five grains injected into a cat at 3 P. M. gave rise to no symptoms till 11 A. M. the next day, when she refused her food. At 2 P. M., twenty-three hours after the injection, she began to show muscular weakness, and she died at 6 P. M.

I now turn to the subject of *Anthropology*, and have great pleasure in announcing that the differences that have for several years prevented a fusion of the Anthropological and Ethnological Societies of London are at last amicably arranged, and that in place of the two rivals societies we now have the *The Anthropological Institute of Great Britain and Ireland*, under the presidency of Sir J. Lubbock, Bart.

The most important article in the January number of the *Journal of the Ethnological Society* is Prof. Huxley's communication "On the Geographical Distribution of the Chief Modifications of Mankind." If I recollect rightly, he enunciated his views in a lecture which he originally delivered about three years ago, at Norwich, when the British Association met at that city. His paper is illustrated by a colored map of the world, in which the different types are represented by special tints. He believes in four principal types, viz.: 1. The Australioid type; 2. The Negroid type; 3. The Xanthochroic type, or Fair Whites, and 4. The Mongolian type. He begins with the consideration of the characteristics of—

I. THE AUSTRALIOID TYPE.—The males of this type are commonly of fair stature, with well-developed torso and arms, but relatively and absolutely slender legs. The color of the skin is some shade of chocolate-brown; and the eyes are very dark-brown or black. The hair is usually raven-black, fine and silky in texture, and it is never woolly, but usually wavy and tolerably long. The beard is sometimes well developed, as is the hair upon the body and the eyebrows. The Australians are invariably dolichocephalic, the cranial index rarely exceeding seventy-five or seventy-six, and often not amounting to more than seventy-one or seventy-two. The brow ridges are strong and prominent, though the frontal sinuses are in general very small or absent. The *norma occipitalis* is usually sharp and pentagonal. The nose is broad rather than flat; the jaws are heavy, and the lips remarkably coarse and flexible; there is usually strongly-marked alveolar prognathism. The teeth are large, and the fangs usually stronger and more distinctly marked than in other forms of mankind. The outlet of the male pelvis is remarkably narrow.

These characters are common to all the inhabitants of Australia proper (excluding Tasmania), and the only notable differences to be observed are that, in some Australians, the iliac crest is high and wall-sided, while in others it is remarkably depressed. No skulls are, in general, so easily recognizable as the examples of those of the Australians, though those of their nearest neighbors, the inhabitants of the Negrito Islands, are frequently hardly distinguishable from them.

The only people out of Australia who present the chief characteristics of the Australians in a well-marked form are the so-called hill-tribes, who inhabit the interior of the Deccan, in Hindostan.

To this type, in a modified form, belong the ancient and modern Egyptians; although the Egyptian has been much modified by civilization and probably by admixture, he still retains the dark skin, silky, wavy hair, the long skull, the fleshy lips, and expanded nostrils which approximate him to the Australian nearer than to any other form of mankind.

It is a most remarkable circumstance that no trace of the Australioid type has been found in any of the islands of the Malay Archipelago; a like dark-skinned people, who occur in some of these islands, and in the Andamans, being Negritos. On the other hand, no Negroid type occurs between the Andamans and East Africa, the darker south Arabian people being Australioid rather than Negroid.

II. THE NEGROID TYPE.—As the chief representative of the Australioid type is the Australian of Australia, so is that of the Negroid type the Negro of South Africa (including Madagascar) between the Sahara and what may be roughly called the region of the Cape.

The stature of the negro is, on the average, fair, and his body and limbs are well made. The skin varies in color through various shades of brown to what is commonly called black, and the eyes are brown or black. The hair is usually black, and always short and crisp or woolly; the beard and body hair commonly scanty. Negroes are almost invariably dolichocephalic. The author has not met with more than one or two skulls with an index of eighty, while indexes of seventy-three or less are not uncommon. The brow-ridges are rarely prominent, the forehead retaining a good deal of the feminine or childlike character. The *norma occipitalis* is often pentagonal, but not so strongly as in the Australian skull. Prognathism is general, and the nasal bones are depressed; hence the nose is flat as well as broad. The lips are coarse and projecting.

The Bushmen of the Cape area must be regarded as a special and peculiar modification of the negroid type. The

are remarkable for their low stature, the males rarely much exceeding four feet in height, while the females may fall considerably below that stature. Both sexes are remarkably well made. The skin is of a yellowish-brown color, the eyes and hair black, and the latter woolly. They are all dolichocephalic; and the brain of the female pelvis has its antero-posterior diameter longer than the transverse, in a larger proportion of cases than in other forms of mankind. One of the most curious peculiarities of the people is the tendency to the accumulation of fat on the buttocks, and the wonderful development of the nymphæ in the females. The Hottentots seem to be the result of crossing between the Bushmen and ordinary negroes.

In the Andaman Islands, in the Peninsula of Malacca, in the Philippines, in the islands which stretch from Wallace's line eastward and southward, nearly parallel with the east coast of Australia, to New Caledonia, and, finally, in Tasmania, men with dark skins and woolly hair occur who constitute a special modification of the negroid type—the Negritos. Only the Andamans have presented skulls approaching or exceeding an index of eighty; all the other Negritos, the crania of which have been examined, are dolichocephalic. But the skulls of the eastern and southern Negritos present a remarkable approximation to the Australioid type, and differ notably from the ordinary African negroes in the great brow-ridges and the pentagonal *norma occipitalis*. The best-known and the most typical of these eastern Negritos are the inhabitants of Tasmania and New Caledonia, and those of the islands of Torres Straits and of New Guinea. In the outlying islands to the eastward, especially in the Feejees, the Negritos have certainly undergone considerable intermixture with the Polynesians, and it seems probable that a similar crossing with Malays may have occurred in New Guinea.

III. THE XANTHOCHROIC TYPE.—A third extremely well-defined type of mankind is exhibited by the greater part of the population of Central Europe. These are the Xanthochroi, or fair whites. They are all of tall stature, and have the skin almost colorless, and so delicate that the blood really shows through it. The eyes are blue or gray, the hair light, ranging

from straw-colored to red or chestnut; the beard and body-hair abundant. The skull presents all varieties of forms, from extreme dolichocephaly to extreme brachycephaly. On the south and west this type comes into contact and mixes with the Melanochroi, or dark whites, while on the north and east it becomes mingled with the people of the Mongoloid type, who bound it on that side. Its extreme northwest limit is Iceland; its southwest limit the Canary Islands; its south border lies in Africa, north of the Sahara, in Syria, and Northern Arabia; its southeastern limit is Hindostan, while in a northeasterly direction traces of it have been observed as far eastward as the Yenisei.

IV. THE MONGOLIAN TYPE.—An enormous area, which lies mainly to the east of a line drawn from Lapland to Siam, is peopled for the most part by men who are short and squat, with the skin of a yellow-brown color, the eyes and hair black, and the latter straight, coarse, and scanty on the body and face, but long on the scalp. They are strongly brachycephalic, the skull being usually devoid of prominent brow-ridges, while the nose is flat and small, and the eyes are oblique. The Malays proper, and probably the indigenous people of the Philippines, who are not Negritos, fall under the same general definition.

On the other hand, the Chinese and Japanese, in whom the skin, hair, nose, and eyes, are like those of the Mongoloid just mentioned, are dolichocephalic; and the Ainos, also dolichocephalic, are distinguished for the extraordinary development of hair on their faces and bodies.

The Dyaks of the interior of Borneo are likewise dolichocephalic, and these people and the Battaks of Sumatra, the so-called Alfurus of Celebes, and the inhabitants of other easternmost islands of "Indonesia," seem to pass insensibly through the people of the Kelew Islands, and of the Carolin and Ladrone Archipelagos, into the Polynesians, in whom the straightness of the hair and the obliquity of the eyes disappear, while in the majority the skull is long, and often approximates to the Australioid type.

As linguistic evidence leaves no doubt that Polynesia has been peopled from the west, and therefore possibly from India

nesia, it becomes an interesting problem how far the Polynesians may be the product of a cross between the Dyak, Malay, and the Negrito elements of the population of that region. The author is inclined to think that the differences which have been over and over again noted, between the elements of the population in Polynesia, and notably in New Zealand, may be due to such a mixed origin of the Polynesians.

To the northeast, the Mongoloid population of Asia comes into contact with the Tchuktetsi, who are said to be physically identical with the Esquimaux and Greenlanders of North America. These people combine, with the skin and hair of the Asiatic Mongoloids, extremely long skulls. The Mongoloid habit of skin and hair is also visible in the whole population of the two Americas, but they are predominantly dolichocephalic, the Patagonians and the ancient mound-builders alone presenting unmistakable brachycephaly.

The four great groups of mankind, the areas of which have now been defined, occupy the whole world, with the exception of Western and Southern Europe, cis-Saharan Africa, Asia Minor, Syria, Arabia, Persia, and Hindostan. In these regions are found, more or less mixed with Xanthochroi and Mongoloids, and extending to a greater or less distance into the conterminous Xanthochroi, Mongoloid, Negroid, and Australioid areas, the men whom the author has termed Melanochroi, or dark whites.

Under its best form this type is exhibited by many Irishmen, Welshmen, and Bretons, by Spaniards, South Italians, Greeks, Armenians, Arabs, and high-caste Bramins. A man of this group may, in point of physical beauty and intellectual energy, be the equal of the best of the Xanthochroi, but he presents a great contrast in other respects to the latter type, the skin, though clear and transparent, is of a more or less brown hue, deepening to olive; the hair, fine and wavy, is black, and the eyes are of a like hue. The average stature, however, is ordinarily lower than in the Xanthochroic type, and the make of the frame is usually lighter. In Hindostan, the Melanochroi pass by innumerable gradations into the Australioid type of the Deccan, while in Europe they shade off by endless varieties of intermixture into the Xanthochroi.

He has great doubts if the Melanochroi are to be regarded as a primitive modification of mankind in the sense in which that term applies to the Australioids, Negroids, Mongoloids, and Xanthochroi. On the contrary, he is much disposed to think that the *Melanochroi* are the result of an intermixture between the Xanthochroi and the Australioids. It is to the Xanthochroi and Melanochroi, taken together, that the absurd denomination of "Caucasian" is usually applied.

As might naturally have been expected, this remarkable paper gave rise to a discussion, in which Mr. George Campbell, a great Indian authority, and Mr. Wallace, took part. Mr. Campbell stated that all the information he had collected supported Prof. Huxley's view regarding the supposed connection between the aborigines of India and the Australians; and he added that there was reason for believing that traces of lingual affinities existed between the Dravidian aborigines and the Australian. He then adverted to the disappearance of the long-recognized Aryans and Semites in the new classification, and their replacement by the Xanthochroi and Melanochroi, and suggested that a distinction founded on color *alone* was uncertain. He doubted whether, looking to palpable physical features, there was a distinct race of Semites; but taking Aryans and Semites together under the name of Caucasians, he suggested another classification. Some Caucasian countries present the most perfect form of the race, the handsome, high-featured people represented by the Jewish type. This type prevails among the Afghans and peoples of the hills to the northwest of India, who are Aryans. The same type prevails not only among the Aryan Persians, but also among the Jews, Syrians, and northern Arabians. The people of this type occupy a continuous area from the Syrian shores of the Mediterranean through Northern Arabia and Persia, to the source of the Indus, including the ranges of the Caucasus. The central and southern Arabians present another type; the short, swarthy, small-featured Arabs contrasting strongly with the tall, handsome Persians. He supposed that, as the true Caucasians descending southward, and mixing with the Australioids, became Hindoos, so that, mixing in Southern Arabia with some other race, they became the short, swarthy Arabians.

already referred to. Again, descending to the northwest into Europe, he believed that our Caucasian ancestors intermixed with some primitive races of cockle-eaters and shell-mound-makers, who shortened our noses, detracted from our beauty, and rendered us the mixed and varied race that we now are. Instead of dividing the peoples of Europe and Western Asia, according to Prof. Huxley's proposal, he would distinguish them as perfect and imperfect Caucasians.

Mr. Wallace pointed out the fact, recorded in his "Malay Archipelago," that in two of the great primary groups—the Mongolian and the Negroid—the mental characteristics were as distinct as the physical characters. The only point on which he differed from the classification of Prof. Huxley was, as to the position of the brown Polynesians. These, as typically represented by the Tahitians, appeared more nearly related to the Papuans than to the Malays, and should therefore be classed as Negroid instead of Mongoloid.

In addition to the preceding paper, there is an abstract of an address by Prof. Huxley, "On the Ethnology of Great Britain," but, as the views contained in it are essentially the same as those contained in his lecture on "The Forefathers and Forerunners of the English People," noticed on page 164 of this volume, I pass it over without comment.

At the same meeting of the Society, at which this paper was read, Dr. T. Nicholas communicated a long memoir (extending over fifteen pages of the *Journal*) "On the Influence of the Norman Conquest on the Ethnology of Britain." The conclusion at which he arrives is, that "the people who came in with William the Conqueror, though called 'Normans,' were Norman in blood in a lesser, Cymric and Gallo-British in a far greater degree; and making every allowance for those of purely Norman extraction, who before and after the conquest settled permanently in the country, the preponderance was greatly in favor of those social characteristics which were ascendant in Britain after the Saxon conquest, and had been scarcely balanced by the Teutonic after the invasion of the Danes."

The only other paper in the current number of the *Ethnological Journal* that I shall notice is a very remarkable

memoir by Mr. E. B. Tylor, on "The Philosophy of Religion among the Lower Races of Mankind." As the term *spiritualism* has got a special meaning in connection with a peculiar modern sect, he uses the term *animism* for belief in spiritual beings. This animism is the groundwork of the philosophy of religion. In answer to the question, "Have such a tribe a religion?" if they are animists, we may say, "Yes," so that animism may be regarded as the definition of minimum religion. After discussing the question whether there are any races who have no religion, he arrives at the conclusion that "prereligious tribes may have existed or may still exist, but that, if they exist, they must be found among extinct ancient tribes or imperfectly described modern ones."

Animism, according to Mr. Tylor, divides itself roughly into two great divisions: 1. Souls; 2. Other spirits.

It is proper to place souls first; for the conception by the lower races of the human soul seems to be that on which they formed and modelled their general idea of spirits.

The savage mind appears to have been especially struck by two groups of phenomena, which they endeavored to account for on a scientific theory:

(a) That which constitutes the difference between a living and a dead body—the fading of light from the glazed eyes, the cessation of breath, the stoppage of pulsation, the loss of consciousness and voluntary movement—in a word, of the phenomena classed together under the heading "Life." These they especially associated with the breath; how naturally we may learn from the story of the deaf, dumb, and blind Lazzara Bridgman's dream, which she described by the gesture of taking something from her lips, explaining in words, "I dreamed God took up my breath to heaven." The language of the world will express this deep-lying connection in the many cases where the word breath has come to denote life or soul; from the Australian *wang* and the Malay *nāwa*, to the Semitic *nephesh* and the Indo-European *pneuma*, *anima*, *ghost*, etc.

(b) The phantom copy of man seen in dreams and vision, apparently thin enough to flit through space and permeate solid nature, and to evade the dreamer's waking grasp. This is

specially and naturally associated with the shadow, an association also well expressed in languages, from the Ojibway *tahchuk* to the Indo-European *skia*, *umbra*, *shade*.

Now, the savage to a remarkable extent connects these two conceptions into what may be called an apparitional soul, a *host-soul*. He considers that what causes death and what causes visions and dreams are one and the same. There are some who try to separate them, as the Greenlanders and the Feejeeans; but the generally-received connection of the life with the phantom into a soul-ghost is the very key to savage psychology.

Thus the Nicaraguans held that when a man dies there comes out of his mouth ' something resembling a person, which follows the life, and which departs to where the man is, but the body remains here. Parallel to this is the African conception of the man's shadow seized by a monster, whereupon the man afterward dies—a story which appears to give the fundamental idea of the well-known European folk-lore tales of shadow-men.

The soul-ghost appears in dreams and visions. Live men's souls may do this, as when a Feejeean's soul goes out in sleep and troubles other people. But especially the souls of the dead are supposed to do this. Thus Wilson says of the negroes that their dreams are visits from souls of deceased friends, and that the habit of talking dreams over makes them dream the more till they have almost as much intercourse with the dead in sleep as with the living in waking, and can hardly distinguish dream from fact.

The animistic theory, as it explains death, so among many peoples explains sleep, and with this dreaming works in, as when a Greenlander lies insensible while his soul goes out hunting and visiting. The Karens cleverly account for the fact of our finding known places in dreams by saying that the *leip-pya* can easily find the way where it has been before in life. It explains

¹I have been told that the Mohammedans prefer any kind of death to that caused by hanging, because strangulation prevents the normal escape of the soul to heaven by the mouth, and necessitates its escape to a state of defilement by the anus, thus rendering it unfit for association with pure souls.—G. E. D.

coma, where the body lies senseless while the mind wakes with new experiences, as when Australian or Khond sorcerers go out of their bodies for spirit-knowledge, or where, in the Vatus-dæla Saga, the Finns sent to visit Iceland lie rigid while their souls go out on the errand and return with information. Of classic tales appropriate to these things, is the story of Hermetimos, whose body his wife burnt while his soul was gone out in search of spiritual knowledge. It explains sickness, as when the Karens call back the *kelah* of a sick man, and the sick Feejeean may be heard bawling for his own soul to come back.

When the body dies, the soul departs to its place. Not content with this, the lower races assist Nature, and, when a warrior or chief dies, dispatch wives and slaves whose souls are to continue their earthly relations. Thus the Feejeean and African are buried with wives, slaves, etc., the custom extending upward into the Hindoo *suttee*, etc.

That animals—"our younger brothers," as the North American Indian calls them—have souls like men, is an obvious inference to the lower races, and has continued to some extent into modern speculative philosophy. Therefore animals also are sacrificed for the dead; the horse for the red Indian, the dog for the Aztec and Greenlander, the camel for the Bedouin.

Lastly, not only men and animals have souls, but in savage philosophy things also, which at any rate are seen in dream and vision. This doctrine is distinctly believed among the Algonquins, Feejeeans, and Karens. All these send objects for the use of the dead on his journey, and though among most savage and higher races no such theory is stated, yet we find it considered that the objects are for use, and will pass into the possession of the deceased. Thus in Madagascar, Badama was seen riding the horse and dressed in the uniform buried with him; the Caribs destroy slaves, dogs, and weapons; the Guinea negroes offer wives, slaves, property, gold fetishes, etc., for use in the other world. In modern Asia, the Kirgheez kill horses, gold is offered and implements of craft—much as the old Scythian in funerals sacrificed wife and servants, gold vessels, etc.

The importance of this point consists in its being a test whether savage philosophy dwindles into survival, or whether, on the other theory, we are to suppose that nonsense is degraded into sense.

As regards the details of the doctrine of a future life among the lower races, no immortality is recognized; the soul is hereal and surviving, not immaterial and immortal. It carries on a mere continued existence, as shown by dreams and visions. The descriptions of future existence current among the lower races are not limited to a single theory, but include every idea likely to occur to them. The conception may be roughly divided as follows:

1. The doctrine of the ghost hovering or wandering on earth, or coming back occasionally to visit its former home, is displayed among mankind from savagery upward, especially among the prevalent fear of graves, and the practice of offering food for the dead, usual among most savage races, lasting among such nations as the ancient Romans and modern Chinese, and even now surviving in form in the Eastern Church.

2. The doctrine of metempsychosis. The transmigration of the souls of the dead into other human beings is well marked among the Greenlanders, where widows will make it a condition for the adoption of an orphan child by some rich man, declaring it to have received the soul of some one of his family; among tribes of Nootka Sound, who account for the existence of a distant tribe speaking the same language, by supposing them animated by the souls of their own dead. In Africa the dead are buried near the living, that their souls may enter new-born children. The indigenes of Africa, America, and Asia, account in this way for likeness to deceased relatives, and look for personal likeness and marks of ancestors on new-born infants. The belief in transmigration to animals is well marked among the lower races, as in Greenland, where a man will avoid a particular animal as food, on the score of a deceased kinsman having passed into such; among the Icannas of Brazil, who imagine that brave warriors become beautiful birds, and cowards reptiles; or the

Zulus, who believe that certain harmless common house-snakes are animated by the souls of deceased kindred.

3. The doctrine of the residence of departed souls in another world. One thought is very prevalent in the conceptions on this subject—that of taking the sun-myth as a type of the destiny of man, and placing the land of the dead in the region of the sunset.

Examples of the localization of the land of the dead may be given: 1. The happy Western Islands, as to which the mythology of the modern Australians and Feejeeans agrees with that of the ancient Greeks. We ourselves dwell in these islands of the blessed, for such Britain seemed to the Continental nations of Europe. 2. The under-world of the Kamehadal, whither the sun descends at night, and where souls of men and animals descend; the subterranean caverns, where the Patagonian looks forward to a new life of perpetual drunkenness; and so on, to the Sheol of the Jews and the Hades of the Greeks. 3. The abode of Heaven, whither the Winnebagoes travel by the Milky Way; the Path of the Dead, or where Tamoi, the Ancient of Heaven, awaits the Guaragos of Brazil; and so onward, to the familiar conceptions of a paradise in the skies.

In completing the classification of orders of the spiritual world as recognized by the lower culture, an important group has to be noticed as intermediate between mere souls in their ordinary function and superhuman demons or deities. This class is that of manes, souls in origin, but demons or deities in quality. They thus form an instructive transitional series, favoring the opinion that spirits in general are modelled on human souls.

Manes-worship is strong among savage races. The Polynesian and South African propitiate them as the great causes of good and evil to man. West African negroes and indigenes of British India alike keep up their ancient cults, which reaches its height in the ancestor-worship which is the essential religion of China, and survives in fragmentary relics among cultured nations.

As a human soul goes into its body, so other vital phenomena are accounted for by the entrance of spirits; and that

have the great theory of disease-possession. Even the Tasmanians and Polynesians can feel demons knotting and twisting in their inside; and the *Minta* have a *hantu* for each disease. Especially certain peculiar diseases are so explained—epilepsy, delirium, hysteria, mania, etc. The East Africans simply explain madness and idiocy by saying, "He has fiends." In South Africa, delirium or fits are supposed to be caused by possession by a ghost, for here still the analogy is kept up, and the disease-spirit is not only like a human soul, but may be one. So in British India, etc., the phenomena of demoniacal possession, raving, convulsions, breaking cords, speaking strange things in the name of the demon they suppose inside them, may still be seen as of old, and the exorcist's profession survives.

The disease-spirit has to be got out or away from the patient by the savage exorciser, and sometimes he only drives it away as people hunt away a haunting ghost. But here, again, sometimes the typical analogy of the human soul comes into play. To get rid of this spirit they seem to say, "Let us get it a new body to enter or pervade." Burton describes the Central African habit of transferring diseases into bits of stick or rag, etc., which forms what is called the *keti* stool on which the noxious influence sits, and it is got rid of by hanging it to a sacred tree—a practice which, apparently in part for the same reason, prevails in Europe and is not forgotten in Ireland. Modern folk-lore keeps up the idea of transferring disease into objects, such as flowers, coins, etc., which are given to others, or left for them to find.

As the soul may be in or out of the human body, so other spirits are held to exist free or to become embodied. Thus the North American Indian's rattles, possessed by spirits, can receive offerings and utter oracles. Mr. Darwin saw a dressed-wooden spoon become lunatically possessed, and dance in the hands of the women holding it.

It has thus been attempted to set forth very briefly the outlines of lower animism. The theory of its development may thus recapitulated: Man's earliest and primitive conception of a spiritual being may well have been that of his own human soul, the idea of which may serve to explain many of the great

phenomena of his own existence—life, death, sleep, dreams, visions, ecstasy, disease. Then he may have extended this conception to souls of animals, trees, even lifeless objects. Then looking to the analogy of his own human life to explain the action of Nature at large, he attributed to other spiritual beings, bearing strong likeness in form and character to the souls, the existence and growth of a nature which to him was indeed “animated nature” in a sense far beyond ours. These spiritual beings are of many orders, from low elves up to great fetid deities, like Heaven or Sun, and the Polytheism of low races even shows traces of approach to the supremacy of one great deity, and thus faintly foreshadows the coming Monotheism. But throughout his hierarchy the human conception served as his model of the divine.

This may be called the natural theology of the lower races.

“The great question for ethnographers is, Do these savage views represent *remnant* or *rudiment*? If they represent a remnant of broken-down high culture, they are of comparatively little consequence. But if, as the writer believes, they represent human thought at a comparatively rudimentary stage, they become of immense practical interest. To understand the rude animism of the lower races, and to trace it onward as modified from century to century to fit with more advanced intelligence, are indispensable to the full comprehension of not only the historical but the actual position of philosophy and theology.”

In connection with Mr. Tylor's paper, I may state that the Religious Element in Ethnology is very fully discussed in the sixth volume of Dr. Bastian's great work on the races of Eastern Asia, which has just appeared. It may be obtained as an independent volume, under the title, “Reisen in China von Peking zur Mongolischen Grenze und Rückkehr nach Europa.” I have not yet had an opportunity of reading it, but it is described as forming a portly volume of seven hundred and eighty pages, and as “a labyrinth of amazing erudition.”

The January number of the *Journal of Anthropology* commences with an article (translated from the annals of the Society of Cracow) entitled “Anatomico-Anthropological Observations upon the Body of a Negro,” a robust subject aged thirty

five years, but only five feet three and a half inches in height. I can only find space for noticing a very few points in this paper. The *brain*, deprived of its pia mater, and compared with that of an adult Wallachian woman, did not present the least difference in the color of the white and gray substances, and the cerebral folds, excepting those at the base of the fossa of Sylvius, were fully as numerous and varied as in the brain of the woman. The cerebellum was of the usual size, but much flattened. The *weight of the brain*, deprived of its membranes, was 955 grammes, of which 480 belonged to the right and 475 to the left hemisphere. The cerebellum, with the annular protuberances and the medulla oblongata, weighed 150 grammes; the entire weight of the encephalon being 1,105 grammes (or 39 ounces avoirdupois). A reference to Dr. Peacock's letter shows that this brain was 100 grammes less in weight than that of the most degraded negro of Central Africa, the average weight in African races in general being 1,244 grammes. This case confirmed the accuracy of Scamminger's observation, that the nerves of negroes are larger than those of whites, relatively to the mass of the brain. With regard to the genital organs, it is stated that "the pendent scrotum was completely black. The circumcised penis was of extraordinary volume. In a relaxed state it measured five and a half inches in length, and about one inch and a half in thickness. In imperfect erection, produced by the injection of melted suet, it attained a length of six inches and three-quarters, measured from the upper edge of the pubis, and a thickness of from one and a half to two and a quarter inches. The glans penis was broad and conical, and of a deeper color than its neck, which was richly provided with megmaeous glandules." The nervules of the penis were greatly developed."

Among other points discussed in this paper is the still unsettled question of the *color of cicatrices*. This case supports the opinion "which is certainly incontestable, in a physiological point of view, that cicatrices among negroes become as deeply colored as their skin. The inverse production of pigment is also considered very fully; there being two forms of it, namely, the yellow, the vehicle of which is the serum of the blood, and the black, which has its principal seat in the solids of the blood."

M. Trake has contributed a valuable paper on "The Physical Characters of the Australian Aborigines." The most striking peculiarities are: 1. The great prominence of the brow; 2. The contraction of the lower jaw; 3. The wide expansion of the nostrils, combined with great depression of the nose at the base; 4. The extreme width of the mouth; 5. The absence, sometimes observable, of any difference in form between the incisor and canine teeth; 6. The straightness and silkiness of the hair; and 7. The hairiness, in some cases, of the entire body.

Mr. Lewis's "Notes on the Builders and the Purposes of Megalithic Monuments" are too important to be passed over in silence. To the question "Who were the Builders?" he thinks that, so far as Europe and Africa are concerned, there can be but one reply—the Celtic nations, and the peoples influenced by them, as Celts, Gaels, Umbrians, Iberians, Belgæ, and Scandinavians. With respect to Asia, he cannot speak positively. With regard to the purposes of these monuments, he considers that all had probably some more or less religious or public purpose, but not of a uniform character. He discusses at considerable length the chief varieties of these monuments, namely: 1. *Alignments*, or arrangements of upright stones in lines; 2. *Cromlechs*, or arrangements of upright stones in circles; 3. *Dolmens*, or table-stones; and 4. *Menhirs*, or single upright stones. He regards the circles and alignments as having been used for sacrificial purposes. The dolmens are of at least two classes: one like "Wayland's Cave" in Berkshire, in the form of a chamber or gallery, with or without lateral chambers, partly sunk in the ground and generally covered with earth; while the other, like Kit's Coty House, is not sunk in the ground or intended to be covered. Both these kinds are found in India: the former sepulchral, covered to the capstones, and called *kodi-kals*, or umbrella-stones; the latter not covered, and without sepulchral remains, called *topi-kals* or capstones. All dolmens of the first class may be regarded as sepulchral, those of the second class were mostly sacrificial, though, perhaps, sometimes erected as memorials, or used to burn bodies upon. The menhirs may have

review of Dr. Lonsdale's excellent biography of the
omist), in which Knox's claims as an anthropologist
brought forward; Dr. Charnock "On the Affinities of
alians" (being a review of two works bearing on the
he Latin language, and of Ellis on "The Asiatic Af-
the Old Italians"); and a review of Dr. Ginsburg's
"The Moabite Stone," a subject to which I briefly
my last letter, and on which there is an excellent
Mr. Pengelly, the well-known geologist, in *Once a*
January 28th.

the *Journal of the Anthropological Society of Lon-*
h is always appended to the *Journal of Anthropol-*
an abstract of a very valuable paper on the varia-
ie blood-corpuscles in different races, and bring to a
ter which has far exceeded my proposed limits.

skewell, who is the Government Officer of Health at
has contributed a paper to the Anthropological So-
"The Condition of the Blood-Corpuscles in Certain
When investigating the symptoms and pathology of
fevers, he made numerous microscopical examina-
e blood, both of the sick and the healthy. In Trini-
g to a very large immigration of people of various
had opportunities of seeing the effects of disease on
s, English, French, and Portuguese, besides a few Ital-
nans, and people of other nations—on Asiatics, in-
he different races that inhabit our Indian dominions,
on Africans that in natives of Africa landed

besides the difference produced directly by disease, in the number, color, and form, of the blood-corpuscles, there were well-marked differences among the different races. For example, he found that, between the blood of the flesh-eating Mussulman and the Hindoo, although coming from the same place, there was a marked distinction. The Hindoo's blood contains a much larger number of white corpuscles; the red corpuscles are smaller, less numerous, not so round in outline, the edge being sometimes almost stellate, or serrated, while they never, so far as his observations went, ran together like rouleaux of coin. Now, it is well known that this phenomenon is described, in all books on physiology, as a characteristic of healthy human blood. The red corpuscles of the Hindoo, however, run together edge to edge, but not side to side; and thus form, under the microscope, a flat mass. This often, when the patient is weakly or has had intermittent fever, becomes a sort of "squashy" mass. It seems as if the weight of the thin glass cover had crushed the corpuscles into one flat mass, in which the separate cells could no longer be observed. For the sake of brevity he applies the term "nummulating" to the coin-like aggregation of the corpuscles. A defect or absence of this form occurs in all persons who have long suffered from malarious fevers.

The Hindoo's blood is marked by the characteristics above mentioned; the Mussulman's much more nearly approaches the normal standard. It nummulates rapidly and completely. The red corpuscles are well formed, much more numerous, and better shaped, than in the Hindoo, and the blood is redder and thicker. So characteristic are the appearances presented, that being in conversation with the surgeon of a recently-arrived immigrant-ship, having Indians from Calcutta on board, as he seemed rather incredulous, the author offered to take his microscope down to the immigrant depot and tell him, from the appearance of the blood, which were Hindoos and which Mussulmans. This he did, to the astonishment of the surgeon, without a single mistake.

The blood of the recently-arrived European is generally rich and good, and affords a great contrast to the Hindoo, but after a time it deteriorates; it no longer nummulates, but

forms squashy masses, and if the spleen is enlarged there will be too many white corpuscles.

The blood of the negro resident, even in the most malarious localities, if he is only tolerably well fed, is a rich red; crowded under the field with red corpuscles, much more numerous than the white man's, and these red corpuscles nummulate with extreme rapidity. Their form is always perfectly circular. The Chinese approach the negro very nearly, but his observations on them are few.

The colored Creoles have, when healthy, blood which approximates, more or less, to that of the negro. He has never, either at home or in the West Indies, seen the blood of a pure white so rich as that of a negro.

ART. V.—*Clinical Lectures delivered at the Bellevue Hospital Medical College, Session of 1870-'71.* By WILLIAM A. HAMMOND, M. D., Professor of Diseases of the Mind and Nervous System, and of Clinical Medicine; Physician-in-Chief to the New York State Hospital for Diseases of the Nervous System, etc. The Histories prepared by T. M. B. CROSS, M. D., Assistant to the Chair of Diseases of the Mind and Nervous System; and Resident Physician of the New York State Hospital for Diseases of the Nervous System.¹

LECTURE V.

APHASIA.

I YESTERDAY brought before you the subjects of cerebral embolism and thrombosis, and one of the consequences of those affections, softening of the brain, or *ramollissement*. To-day I shall take up another very important consequence, *aphasia*, which the cases you see present will very clearly illustrate.

By aphasia we mean loss of the power of speech; but, of course, we restrict the term to express that loss only under certain conditions. Thus, if a man is struck senseless by a blow, or if he has his tongue cut out, we do not call his inability to speak, aphasia. The word is used to signify the loss of the

¹ Phonographic report of Dr. John Winslow.

ability to express ideas by language, either from forgetfulness of the words to be employed, or from lack of power so to coördinate the muscles of speech as to articulate them when remembered. Of the distinction between these two kinds of aphasia I will speak further on. But first a few words with regard to the faculty of speech, and the location of its organ in the brain. That such a faculty exists there can be no question, but that it, or any other intellectual faculty, has any special part of the brain appropriated to it, has been a matter of grave and often bitter dispute. Without entering into a discussion of the general question, which would show us overwhelming and, in my opinion, conclusive arguments in the affirmative, let us glance at its history with reference to this special faculty of language.

In the early part of this century, Gall, the father of Phrenology—a man far more scientific than the vagaries of many of his would-be followers have led most of us to believe; a man who has done more to establish the study of the anatomy and physiology of the brain upon its proper basis than any one else that ever lived—located the organ of speech in the lower part of the anterior lobes of the brain, that part resting upon the supraorbital plate of either side. According to him, the full development of this organ would depress the supra-orbital plate, and push the eyeball forward. Prominence of the eyes, therefore, was, in his system, the sign characteristic of those persons endowed with great powers of language.

Some years later, Bouillaud adopted and supported Gall's view, locating the organ of speech in the anterior lobes. Subsequently to him, Marc Dax published a memoir—for a long time overlooked—locating it exclusively in the *left* hemisphere of the brain; and, a quarter of a century later, in 1863, his son, George Dax, presented a paper to the French Academy, in which he claimed a very limited region as the seat of the organ, namely, the outer and anterior part of the middle lobe of the left side, immediately bordering on the fissure of Sylvius. Two years before this, Broca, who seems to have been ignorant of the observations of the elder Dax, had announced that the organ was situated in the posterior part of the third convolution of the anterior lobe of the left side. Subsequent

investigations have pointed to the "island of Reil," at the other extremity of the fissure of Sylvius, in the left side, as its probable seat; and a still later view, that of Hughlings Jackson, includes the last three by broadly stating that it is located in some part of that region of the left hemisphere, in the immediate vicinity of the fissure of Sylvius, which is nourished by the middle cerebral artery.

How do we arrive at such a physiological fact as this, if it be? There are four classes of indications by which we may hope to discover the function of an organ—1. Those of anatomy; 2. Those of comparative anatomy; 3. Those of experiment; and, 4. Those of injury or disease.

1. The history of physiology has shown it to be very rare that the scalpel and the microscope alone enable us to determine the function of a part. Even so simple a problem as the mechanical action of some of the muscles remained undetermined until the electric stimulus came to our aid; and we certainly could not expect to differentiate the functions of different parts of the brain by anatomical considerations only. But it has been strongly claimed that the continuity of the several parts of either hemisphere, their similarity of structure, and especially the symmetry of the two hemispheres, preclude us from locating any faculty in one part rather than another, and particularly from confining it to one side of the brain. To this it might be replied that such *a priori* assumptions have no place in inductive science. But let us look at the facts. When you examine the two anterior lobes of a human brain, your first impression is that they are just alike. Closer inspection, however, shows you that the convolutions are not strictly symmetrical in their arrangement upon the two sides; and that the third convolution of the left side is larger than that of the right. Moreover, the gray cortical substance varies in thickness in different parts of the same side, and unsymmetrically on the two sides. Now, take your microscope, and place under it thin sections from twenty or fifty different parts of the brain. You will find no two exactly alike. There is variation in the size of the cells, in their arrangement with reference to each other, and in their arrangement with reference to the white fibres. But suppose that the microscope

showed one part of the brain like every other, and that, even by this means, no difference could be discerned between the two hemispheres, would that be any proof that the different parts, or the two sides, were alike in function? Examine under the microscope a section of the lachrymal gland and a section of the pancreas, and if you can detect the slightest difference between them you have better eyes than mine; yet the difference in function in these two glands, the difference in the properties of their secretions, is not a matter of question. You can easily multiply such examples; but this one is sufficient to show the fallacy of the style of argument we are considering; to show that, with regard to the great gland which secretes the mind (so to speak), we can predicate nothing of the functions of its special parts from their gross or their minute appearances. We have seen, then, that the different parts, and the opposite sides, of the brain are not alike; and, furthermore, that, if they were, it would be no argument to prove their identity of function; and so we dismiss the objections, based on considerations of anatomy, to the localization of the faculty of speech in the region I have indicated.

2. The argument from comparative anatomy we will not stop to consider. Suffice it to say, that it throws much less light upon this question than upon some others in nervous physiology, as, for example, the determination of the ganglia presiding over certain of the special senses.

3. Neither does experiment help us much here. Bouilland performed some experiments upon dogs, which, in his own opinion, corroborated his theory, the animals apparently losing the power to bark after injury to the anterior cerebral lobes. But we cannot accept such a result as satisfactory; for we have no right to assume that the bark of a dog bears any analogy to our own articulate speech; we have certainly no evidence that they communicate ideas by this means. It is, of course, unjustifiable for us to experiment upon the human brain; sometimes, however, accident does this for us, and several interesting cases have been recorded in which injuries to the very limited region I have named have been followed by loss or aberration of speech, while other cases in

part escaped, though the destruction of other parts later, left the speech unimpaired.

Best of all experiments are those performed for us by our pathological processes. For nature does the work better than we can ever hope to do it. She can destroy part of the brain without the slightest injury to and so gradually as to produce no shock, thus get the complications that are so apt to vitiate our own here are various ways in which a limited part of the brain can be affected pathologically, for example, by cystic or other, or by hæmorrhage of small extent. But, among the most interesting and instructive of them all, are the two we have been considering, thrombosis and embolism,¹ which, by more or less completely cutting off the blood-supply of a portion of the brain, impair or abolish its functional power. You know the middle cerebral artery, which is the direct continuation as well as the largest branch of the internal carotid, and the fissure of Sylvius on either side of the brain. We find that when the left middle cerebral artery is occluded by a thrombus or an embolus, the faculty of speech is impaired; when the right one is plugged, this is not so. But it is not in every case of this kind that we have opportunity for an autopsy; how, then, can we tell which side is affected? This same artery, which supplies the region designated as that of the organ of speech, also supplies the corpus striatum, the great motor ganglion. If the flow of blood is stopped by a plug occupying its main trunk, the corpus striatum loses its power, and we have motor paralysis of the opposite side of the body. The situation of the lesion in cases of hemiplegia, then, tells us unequivocally upon which side of the brain is seated the lesion which causes the aphasia. In cases of aphasia with hemiplegia which I have examined only two where the paralysis was on the left side, the same preponderance of evidence is found in the favour of the various lesions revealed by autopsy. Nearly all go to show that injury or disease of the posterior part of the left anterior lobe, or perhaps more es-

¹ See the last number of this JOURNAL, pp. 1-14.

pecially of the island of Reil, is attended with aberration of speech, while lesions of other parts are not so attended.

I have spoken with much positiveness upon this point, to impress upon you the strength of my own conviction. At the same time I am bound to tell you that there are some exceptions—and a single one would be sufficient to overturn the theory that the organ of speech is located *exclusively* in that part of the left hemisphere which has been described. There are rare cases of left hemiplegia attended by aphasia. There are also some cases of aphasia in which post-mortem examination has shown lesion of the right side of the brain alone. How can we explain these seeming anomalies? A simple and ingenious explanation has been proposed by Moxon, of London, which you can accept or not as you please. It is probable that at birth the two sides of the brain are essentially alike in structure and functional capacity, and that both are prepared to take upon themselves the control of the faculty of speech. But the left—which has been shown by Gratiolet to be the earlier developed in the foetus, and the better supplied with blood—is somewhat the stronger, and gets the preference; and this preference, once instituted, tends to maintain itself by force of habit, and the gain of strength from exercise. As the child grows, therefore, the differences in function and in structure of the two sides become more marked. The case is precisely analogous to that of the right and left hand, the right for a similar reason gaining the precedence, and then steadily widening the difference between itself and its fellow. These peculiarities are hereditarily transmitted, and probably at least nineteen children out of every twenty, if entirely untaught, would grow up right-handed and left-brained. But the twentieth child would be left-handed; and he may very probably use the right hemisphere in preference, for the faculty of speech. Certain it is that in some of these cases of aphasia the patients have afterward learned to speak. That they have done so by developing the power in the right side of the brain is made eminently probable by the fact that the left has been found after death disorganized and apparently unfit for any function.

The cases before you confirm the views I have expressed.

exemplify one or more of the several forms of *nesic* aphasia, *ataxic* aphasia, and *agraphia*—explanation I have reserved until now.

means forgetfulness, and amnesic aphasia is that the patient cannot express his ideas because he lacks the words which custom has appropriated to them; not that he forgets how to articulate a word he remembers; for in some rare cases of purely amnesic aphasia any word spoken to the patient he can imitate with distinctness, though he could not do so afterward; but it is the word itself, the combination that stands as the symbol of an idea, which he cannot call at will.

means incoördination, and ataxic aphasia is that the patient, though recollecting the word he wants, cannot articulate it. In the typical case this is a partial paralysis of the muscles of articulation, for the tongue and palate, can be made to assume every position for the formation of all the vocal elements. The patient has partly lost the power to bring these muscles into the action required for speech; he cannot begin to utter a word, for he has forgotten how to will the necessary movements; he is much in the condition of the infant who has not learned to utter words that it still can understand. In some cases this ataxia extends to all the muscles of articulation; in others it is confined to a particular group, as the lips, for example.

It is seldom that we find a case in which either of these forms of aphasia is absolute, in which there is inability to utter all or to pronounce any word whatever. Yet the defect is often very profound, so that the patient may be able to utter only one or two words from memory, or to repeat a word or two when prompted. The curious phenomena sometimes developed from a combination of the two forms, of various degrees of intensity, offer a most attractive field for physiological and psychological speculation; but I will not be tempted to pursue this here, and the phenomena will be better apprehended from a study of some of my remarks of mine.

Agraphia means inability to write. This, like aphasia, may be of two kinds. The patient may be unable to write a word because he cannot recall the word, or cannot recollect its written form; or he may be unable to write it because he cannot coördinate the necessary movements of the hand. In the latter case he cannot write from copy; in the former he can probably copy with more or less facility.

Language, in its most general sense, includes every means of communicating ideas. We may do this by writing or by gesture, as well as by articulate speech. In those languages where the written characters stand for things and not for words, the written and the spoken language being thus independent of each other, it is quite conceivable that there may be an amnesia of the written signs of ideas and not of the spoken, and *vice versa*. Even where the written language is phonetic, like our own, the same thing may perhaps be possible, though purely amnesic aphasia, without agraphia, would indicate that the written words had become to the mind the direct symbols of ideas (as they must be to congenitally deaf-mutes). That we may have ataxia of speech and of writing quite independently is well established by numerous cases. What we have said of speech and of writing will apply also to gesture, or pantomime, so far as this is arbitrary and not instinctive.

To enable us to speak, there must be several organs in a state of integrity—the ear to collect sound, the auditory nerve to convey it to the brain, a ganglion to convert it into sensation, an organ to convert the sensation into an idea; and an organ to convert that into a motor impulse, sent to the muscles of speech. It is clear that the ear must do its work, that we cannot speak unless we have first learned what words are. Deaf-mutes, born deaf, are mute simply because they have never been able to form a conception of what sound is. They have no paralysis or incoördination of the muscles of articulation, and they cannot have forgotten what they never learned; they are not, therefore, properly aphasic. In cases of aphasia the difficulty lies in the ganglia which should convert the sensation into an idea, and send down the motor impulse to the organs of speech.

Let us now look at some cases. Two of the patients before you have previously seen.

William Wice¹ you will recollect as a case of thrombosis, probably of the left middle cerebral artery, resulting in right hemiplegia and ataxic aphasia, the difficulty of speech being ataxic with labials and least with gutturals. Under the treatment by phosphorus and electricity he has greatly improved, so that he can now say "Peter Piper" without hesitating or stammering. He used to say, "P-p-p-p-peter." The next man, Richard Murphy,² you remember, had five weeks of cerebral embolism, causing hemiplegia, sometimes very transient, sometimes more persistent, always on the right side, and attended by amnesic aphasia. He is considerably better than when we last saw him; and when I ask him to say, "tea, coffee, sugar, crackers," he begins boldly, and goes bravely on through the tea, coffee, and sugar, but breaks down over the crackers.

Now I have to present to you a case similar in some respects to the last, and of remarkable interest as confirmatory of the theory that the organ of speech is located on the left side of the brain. This man is a patient in Bellevue Hospital, and the following notes of his case have been taken from by Dr. Schuyler, assistant house-physician:

Repeated Hemiplegia from Embolism—the Right Hemiplegia attended by Aphasia, the Left not so attended.—"Denise C. Minton, Irish, aged forty-four, married, clerk, admitted Ward 14, Bellevue Hospital, November 19, 1870. Gives a military history. Has been a hard drinker for twenty-five years. Three years ago, last March, while walking in the street, he felt a sensation like that of the prod of a pin in the elbow, and his arm dropped powerless. Twitchings of the muscles of the arm and side of the face then began; and headache and dizziness, with cloudiness before the eyes, came on. A twitching of the muscles lasted about seven minutes, when he recovered the use of his arm, though it still felt very awkward. The dizziness and headache remained. This attack was repeated two days afterward, and again a week after

¹ PSYCHOLOGICAL JOURNAL, vol. v., p. 2.

² Ibid., vol. v., p. 10.

that. He then went to the City Hospital, where he had three more attacks. He remained there about four weeks. After leaving he began to drink hard, and the spasm returned again. He now entered the Long Island Hospital, where he recovered, under the use of electricity and a seton in the back of the neck, and had no more spasms until last summer. Before this trouble began, he had had an attack of gout in his left toe, and this has troubled him at intervals since. With the exception of these attacks of gout, he continued well until last summer, when, in the hot weather, after he had been drinking hard, he felt as if a pin had been thrust into his head, and dropped insensible. He was unconscious for about a minute, and when he awoke complained of headache, dizziness, and a feeling as if sponges were under his feet while he was walking. He was brought to the hospital; and about two weeks afterward he suddenly became dizzy, lost his speech, and lost the use of the tips of the fingers of his right hand. This shock lasted about two minutes. Some two weeks later, he had another shock of the same description, and lost the use of his hand up to the wrist. These attacks were repeated every one or two weeks, [the paralysis] gradually extending up until the right side of the face was affected also. The attacks lasted from one to six minutes. There was never any twitching of the muscles of the right arm, but there is of those of the side of the face. When it reached the side of the face, he had a roaring noise in the side of the head during the attack. After each attack he felt weak and dizzy. The last attack occurred the day before admission, and, besides following the usual course, extended like a shock down his right side. His speech and sight have been imperfect since this last attack. Nine months ago he had an attack of Bright's disease. His feet have frequently been swollen since. His sight has been more or less imperfect ever since this attack; and, since the shock on the day before admission, he has been unable to read at all. He is subject to attacks of rheumatism. On admission, bowels costive; tongue furred; feet somewhat swollen; water normal in amount and containing no albumen; physical examination of heart and lungs negative; appetite good."

The symptoms in this case are so exactly those of embolism

cannot attribute them to any other cause. We have a case of rheumatism; and, although at first the auscultation gave a negative result, yet Dr. Flint now discovers a murmur at the base of the heart, and so do I. This murmur is not to indicate positively organic disease; it does not show thickening or insufficiency of the valves, such as would result from fibrinous concretions upon them. But it is improbable that the patient may have had endocarditis—that such concretions may be scattered about the walls of the heart, among its fleshy columns. Here they would give evidence of their presence, and we should first be suspicious of it by their becoming detached and being sent into circulation as emboli, to plug up some distant artery. This patient has had eleven attacks of vertigo, unconsciousness, and hemiplegia. Whenever the attack has paralyzed him on the left side, he has had no difficulty of speech; but, when he has been paralyzed upon the right side, he has lost the faculty of speech for the time. Of course, in the former case the emboli were lodged on the right side of the brain, and in the latter on the left, and most probably in the middle cerebral artery, since that is the artery most apt to be plugged, and one whose plugging is most apt to cause aphasia.

We had the good fortune to meet with another case very similar to this. A former officer of the army, a private patient, had eight attacks of embolism, following a history of acute rheumatism and valvular derangement of the heart detected several years before. When he came under my care he was suffering from one of these attacks of embolism, characterized by paralysis, difficulty of speech, and other symptoms. In seven attacks subsequent to that one, some paralyzing the right, some on the left side; and, as in the case of the first, with the left hemiplegia he had never any difficulty of speech, with the right he always had.

I say that two such cases as these are almost conclusive that the faculty of speech is more intimately connected with the left hemisphere than with the right—mind *more intimately* connected with the left hemisphere, and do not pretend to believe that it is *exclusively* connected

I have now another case of much interest to bring before you. This lady is a private patient of mine, and she has consented, at great personal inconvenience, to come here to-day and allow me to present her case to you. The following very complete history has been prepared by Dr. Cross:

Amnesic and Ataxic Aphasia, with Agraphia and Rigid Hemiplegia.—Mrs. W., thirty-two years of age, born in New York City, married, and the mother of five children, of whom at the present time, four are living. The youngest child is eleven months old, while the eldest is eleven years. She is a lady of a pale complexion, rather delicate, of a nervous temperament, and of medium height, and endowed originally with much intelligence, culture, and refinement.

There is no venereal taint in her family. She has never had acute articular rheumatism, nor in fact any severe illness prior to the year 1860; but, on the contrary, has enjoyed tolerably good health, such as we might hardly expect from a lady of her delicate organization, if we except a severe attack of intermittent fever, which she had when sixteen years old. Her father, when about forty years of age, was paralyzed on the left side of his body, and at the same time his speech was much affected. He recovered the faculty of speech in time but was not so fortunate in regard to his paralysis. After the lapse of twenty years, he had a second attack, which again involved the faculty of speech and the left side of his body. In the due course of time he completely regained the normal use of the faculty of speech, but his hemiplegia persisted until his death, which occurred some years later. Her grandfather, on her father's side, who was one of the assistant ministers of Trinity Church, was suddenly seized in the pulpit, in the middle of his discourse, with the apoplectic form, *par excellence*, of cerebral hæmorrhage, and almost immediately expired. With these exceptions there is no hereditary predisposition to other diseases of the nervous system in the family.

During the month of February, 1860, about three weeks after the birth of her second child, having complained for several days of a severe pain in her right shoulder, which extended down the right arm, symptoms of albuminuria, accompanied with general dropsy, supervened. These were so rapid

followed. Her urine was now examined, and
be loaded with albumen. Shortly after this attack
ia, as she was sitting, leaning forward, with her
ig upon a pillow at the side of the bed, the most
e position which she could assume in her terrible
e was gently aroused from her semi-conscious con-
ien it was found that she was completely hemi-
the right side of her body, and that she was
ble to utter a single audible sound. For at least a
this discovery she was greatly confused in regard
s, and it was fully six weeks before the dropsy had
peared, during which time she was confined to her
period of the convulsion marks the acme or crisis
minuria, as the patient from that period began to
m the very alarming dyspnœa which had almost
her.

mination, soon after, motility, tactile sensibility,
nsation of pain, were discovered to be nearly abol-
the whole right side of the body. The face was
the left side, and there was a marked deviation of
in the same direction. There were strabismus and
sis of the left eye, with a widely-dilated pupil, which
spond readily to light. The angle of the mouth
sed on the diseased side, while the opposite angle
higher level than its fellow would be in a normal

Now she could utter unintelligible sounds, which
however be interpreted into intelligible words

their accustomed contractility. The tongue did not deviate. The sensibility to touch and to pain was still impaired. She could not sew, not so much from a lack of power to hold her needle as a want of sensibility to guide her in directing its movements; yet, by supplying by means of sight the absence of this special sensibility, she was able to accomplish many things with her right hand which she otherwise would have been totally unable to perform. Her special senses, excepting tactile sensibility, were normal, and her general health had much improved. At this period her urine was again examined, and no albumen or casts of any kind were discovered therein. Until the summer of 1863 she had not, for three years and a half, enunciated an intelligible word, and it was about this period that she one day suddenly exclaimed "No!" the first word clearly spoken in all this time. A month later she was able to say "Yes!" With these few words, assisted by her excellent gestures, she managed to make her wants known and to communicate her ideas to her friends to some extent. Shortly after the births of her last two children there again followed general anarsarca, but not to the same extreme degree as in the preceding attack, there being no shortness of breath or other dangerous symptoms. This condition soon disappeared, however, on the administration of powerful diuretics.

Such is the history of this most interesting case up to the time when she came under our observation in October, 1870, at which period she was in the following condition:

She appears to enjoy good health, with the exception of frequent headaches, which have only made their appearance lately. These are severe in character. Her face is pale, but this has always been so ever since childhood. She has, however, a remarkably bright, intelligent, and animated appearance, and when spoken to she seems to fully understand every thing that is said. She is fully conversant with the use of all objects with which she was once familiar, although she cannot call them by name, partially from the fact that she does not remember the symbols or words which express the ideas. She attends to all her household duties and knows perfectly well how to supply all the wants of her numerous family. Although seemingly quite intelligent,

She becomes very much confused in her ideas, as her imperfect gestures and obtuseness of comprehension. She is only able at the present time to articulate "Dado," "Yes," "No," "Yes, no," and "No, yes," and uses in reply to all questions. "Dado" is a word she means to express "yes," and at times she makes use of it almost exclusively. If asked what is the name of an electric fan, for instance—she is totally unable to tell the word, but the symbol which expresses the idea in language, yet she understands clearly enough its use by the gesture of fanning herself. She is able to communicate some of her thoughts to her friends quite fluently by the means of an expressive mime, and her gestures are so perfect that most any one, after a little practice, could understand very well most of her ideas which she might wish to impart. She is unable to read, as was soon discovered by testing her in this respect, in different ways, and at various times. Webster's large dictionary was given to her, and she was asked to point out the letters contained in the word "cat." Even this she could not do until the *y* was first pointed out to her, and then, after clearly pointing out the letters *e* and *s*, she with difficulty found them. The *York Daily Times* was next handed to her, and she was asked to place her pencil on each of the words which commenced with "c," as they were slowly pronounced each separately; although she was now and then correct, she was often wrong, and was very often wrong. She was next tried with the alphabet with large distinct letters, and the result was very far from satisfactory. She cannot enunciate a single letter of the alphabet distinctly, not even the letters *n*, *d*, *o*, *yes*, and *no*, even if they be pronounced separately, if they be separated apart from the word; yet she can say *no*, *No yes*, and *Dado*. She is very apt at figures, and does all her own shopping, going to Stewart's, selecting what she desires, and, on arriving at home, every thing is done as she directs. She knows exactly how much she ought to pay for the article purchased, and how much is due her in return. In all her communication of ideas is expressed by gesture and mimicry. Her mind is very clear at times, and,

while this history was being taken, she reminded her husband of several mistakes which he had made in regard to time and locality, and he certified, on reflection, that she was right. She can write the monosyllable *No*, but that is the only word which she can write completely, although she was able to write *Jar* for "Jane," *goo* for "good," the words being first slowly spelled for her several times just before she tried to transfer them to paper. Certain objects impress her mind much more than others; as, for example, she remembers the subject of a picture much better than the color, drawing much better than pictures. She now recalls many subjects of art in her husband's gallery, which formerly she could not do. Her right hand, as measured by the dynamometer, is a little weaker than the left, and this is evidently due to muscular paresis, as the patient is right-handed. The extensors of the right foot lack their natural tonicity, so that the toe catches at times; but, on the whole, without very close observation, this defect would not be noticed. The sensibility to touch and the sensation of pain are slightly impaired on the diseased side. There is a very weak mitral systolic murmur heard at the apex of the heart. The lungs are normal, and so are the bladder and rectum. The urine has been microscopically and chemically examined, with a negative result. The special senses, excepting tactile sensibility, are unimpaired. There is no ptosis, no strabismus, and no defects in vision whatever. The pupils are equal, and respond readily to light. Ophthalmoscopic examination of the eyes reveals a slightly-congested condition of these organs. There is no deviation of the tongue. There is no paralysis or paresis of the muscles of the tongue, which are perfectly mobile, nor are the lips weakened at all in their movements. The mouth is perfectly natural, and is not drawn to either side. There is no emotionable excitability displayed by the patient, as is so often found in those suffering from cerebral hæmorrhage. There are, however, two well-marked conditions in this case, which are found in many aphasic patients, namely, the repetition of the same word and the characteristic expression of great impatience after an unsuccessful attempt to speak a word. There is no painful tightness in the throat. Her appetite is good, and all her excretory functions are normally performed.

as the patient's condition at the time she commenced. This has consisted in the internal administration of phosphorus as follows: *R.* Olei phosphorati ℥ss,ilaginis ℥j, olei bergamii gtts. xl. *S.* Fifteen taken in a wineglass of water three times a day

together with the application of the primary current to the head, the positive pole placed on one ear, and the negative placed on the other, for the space of two minutes, at times reversing the current; or by applying one of the poles to the forehead and the other to the nape of the neck. In this latter method she felt the same current much more forcibly than when the poles were applied to the mastoid processes. She commenced these applications first passing the current in one direction for a short time, and then in the other, quite regularly twice a week up to the present date, and she has continued the medicine regularly also, only intermitting it for a short time at intervals, as necessity required. During the month of November, 1870, she suddenly one day exclaimed, 'I cannot say no,' but she could not be made to repeat it, and was obliged to do so by her friends. One morning about a week ago she said very distinctly indeed, 'How do you do?' and 'What are you doing here?' but she seemed to be perfectly unable to give utterance to any such expressions.

After this, one Sunday she called to her husband, 'Dinner is ready,' and then smiled. She is unable to repeat these phrases, even if they are first pronounced slowly and spelled for her; and, at this period and even at the present time, she does not repeat them. In regard to numerals, she can count perfectly by means of her fingers, and can read readily, yet she cannot recognize the printed characters shown to her, much less can she represent its value on paper, and much less still can she enunciate it. When she can say *no*, after many trials, it was impossible for her to articulate *one* or even *on*, which is merely a repetition of the letters contained in *no*.

On July 31, 1871, on examination, the patient, who had received treatment for about three months, was in the same condition:

"She has gradually added to the small stock of words her command, at one time a single word, at another a complete phrase, and many of the words thus acquired she is able to repeat at times, but she is unable to call them up spontaneously as occasion requires, unless the sentence or word is first repeated to her, excepting a very limited number of them. The phrases which she does speak are not very distinct, and there is a tendency on her part to abbreviate or diminish the words. The following are sentences which she uses very frequently: 'How do you do, dear?' 'Dinner is ready.' 'I will see about it.' 'Yes,' with an occasional 'yes no, no yes.' 'I will see.' 'Mary, here.' 'Walter,' 'baby,' 'church,' 'thank you,' etc. Within a few days she has said 'John—black-thread.' And to a friend who was going to the dentist she said, 'Are you going to the (with a motion of her hand to her teeth)?' Last evening she said perfectly distinctly 'A house.' Although she had just said *a house*, she could not repeat the word when requested to do so, yet it was enunciated for her very clearly. Day by day she is recalling words and fragments of sentences, like a child just commencing to talk; with this difference, that a child can enunciate a letter better than a word, being a simple element, whereas this patient cannot articulate the name of a single letter, nor of a single number, yet she is able to utter occasionally, and at times more frequently, a whole sentence or a part of a sentence. She is able to point out very correctly all the letters of the alphabet, excepting *c* and *p*, which she confounded with each other. She can comprehend the general idea of a paragraph, such as is contained in a letter or a primary reader, if it be sufficiently simple and abound with nouns, the meaning of which she seems to recall with much greater facility than the other parts of speech. She was given a letter which she had never seen before, and she expressed to her husband, so that he understood her perfectly, the meaning of its contents, which related to matters of interest concerning a particular friend. She was again tried, and there was no doubt whatever that she quite readily recognized certain simple numbers and nouns, but in regard to the interpretation of other parts of speech there were grave doubts. A word, as *river*, was shown her, and she

was asked its meaning, whereat she arose, walked to a picture, and put her finger on its representation in the painting. This is only one instance of the many words which she has so correctly interpreted. She can write at present *no, do, Walter, Jane, good,* and *Sarah*, without any assistance whatever such as spelling the words, pronouncing them slowly or repeatedly for her, and this is done without a copy. Her name was written, and she copied it very well. She also wrote the numerals 10, 20, and 50, quite legibly. More complex numbers than these she cannot even interpret, much less write them without a copy. In regard to copying, she displays much facility. She has improved much in her general health, and latterly her severe headaches have almost entirely disappeared. There is still a slight loss of tactile sensibility in the tips of the fingers of the right hand. Her toe at the present time very rarely catches, except after excessive exercise. Her intellect is undoubtedly much impaired, and, although she is apparently bright and intelligent, this is not actually the case. That the symbols or sign of ideas, when suggested to her, arouse the appropriate stimulus for a brief interval, there is no doubt, although not to the same degree as they would do in health; yet, without this principle of suggestions, her ideas must be very limited, and must partake more of the character of those impressions which we derive through the means of the senses, being almost in her case devoid of ideation. Although she can write certain words which she is totally unable to speak, on the one hand, yet, on the other, she can speak very many words which she is totally unable to write. Not only is there a loss of the memory of words, and a loss of the harmonious action of the muscles used in the act of speaking, but there is evidently also an inability to appreciate the perceptions of certain acoustic as well as certain optic impressions on the part of the supreme centres, and consequently there is an impairment of the faculty of expressing these ideas in writing.

“T. M. B. C.”

This case illustrates, very happily, some of the most characteristic phenomena of aphasia. You see the lady's look of intelligence and animation; and as I talk with her you observe

that she seems to understand me perfectly, though she can reply to my questions only by certain expressions of affirmation of negation, or of doubt. If I ask her my name, or her own she cannot tell me; but, if I give a wrong name, she instantly answers "No no," and, when I come to the right one she appears pleased, and promptly says "Yes yes." These expressions she employs correctly, and they mean *no* and *yes* respectively. "Yes no" or "no yes," in her vocabulary, expresses uncertainty, as you perceive when I ask her matters about which she is in doubt. Her only other word *dado*, she does not favor us with to-day. By no amount of effort can I get her to repeat any other word than these, however simple, and however clearly it is pronounced for her; and this is not from any defect of hearing or of intelligence, for it is evident that she understands the word and its meaning completely. Her aphasia, then, is ataxic as well as amnesic. Here I show you some of her attempts to write. *Jane* she spells by abbreviating it *Jn*; *no* she writes correctly; but in *good* she cannot get beyond the first three letters. She has agraphia, therefore, which appears to be chiefly, if not wholly of the amnesic form.

What do you suppose is the cause of the aphasic condition of this patient? Recollect that it came on very suddenly and was complete from the first, and I think you will agree with me that nothing else explains it so well as embolism. Emboli, you know, are not necessarily formed in the heart; they may originate in other organs, and then become detached and we know that disease of the kidney, attended by albuminuria, is very apt to lead to embolism. And this lady, you will remember, was suffering from very severe albuminuria at the time of and before the attack.

Embolism, as I have told you, is but one of many causes of aphasia. Another is cerebral hæmorrhage. A gentleman whom I saw in this city last summer, had an attack of apoplexy while he was bending forward in bed. He did not lose consciousness for more than a moment, and perhaps not at all but he was paralyzed upon the right side, and he lost completely the power of speech. He made signs for pencil and paper but when they were brought he made only meaningless scribbles.

blings, and could not form a single letter. Yet there was no paralysis of the left side, and he had before been able to write with the left hand, as he can now do. He was very anxious to express himself, and we brought him an alphabet; but he could not point out the letters. He had lost, as completely as did this lady, all memory of words and their elements.

Now, both of these cases would, a few years ago, have been put down under the head of "apoplexy;" for the term was loosely used to cover almost every condition which came on with sudden unconsciousness. It is but lately that we have come to understand this subject of embolism, and you will look in vain for any mention of it in many of your standard text-books. So, if a man fell down in the street with stupor and paralysis from hæmorrhage into the brain, he was said to have apoplexy. If he had the same, or similar symptoms, and the post-mortem examination discovered no clot, the attack was still called apoplectic, and was supposed to have been due to congestion which had disappeared—"congestive apoplexy." They even began to conjecture about "nervous apoplexy." If they had looked in the middle cerebral artery, they would in all probability have found a more satisfactory solution of the mystery. The word apoplexy, then, except in recent writings, must be taken to mean simply a set of symptoms attributable to a variety of causes; just as I told you, some time since, that paraplegia was only a symptom, which might arise from the most opposite conditions.

Before we understood this, and before we knew any thing about aphasia, many cases of this affection, depending upon so-called apoplexy, were recorded, which it becomes interesting to examine under the light of our present knowledge. A few, which I shall now refer to, will incidentally illustrate some of the curious phases that aphasia occasionally exhibits. In Forbes Winslow's "Obscure Diseases of the Brain"—a book as interesting as a novel, but better for summer recreation than for scientific study—he says:

"Loss of speech has been known to occur without any previous symptom of brain or nervous disorder; in other words, there has been no headache, vertigo, noise in the ears, loss of sensibility, depression of spirits, affection of vision, or any

other symptom to excite suspicion as to the presence of any abnormal state of the structure of the brain or condition of cerebral circulation."

That is clearly embolism, which, you remember, gives no premonitory symptoms. He continues :

"Dr. Graves cites the following interesting illustrative case: 'A barrister was walking up and down the hall of the Four Courts, waiting for a case to come on, and chatting with one friend and another. As the hall was rather crowded and hot, he went out into the area of the courts for the sake of the air, and had not remained there more than ten minutes when an old friend from the country came up and spoke to him. He was pleased to see his friend, and wished to inquire about his family, when he found to his great surprise that he could not utter a single audible sound; he had completely lost his voice.'"

Now, I venture to say that no possible condition except embolism could have given rise to that. The report goes on: "He recovered the use of his tongue in about three weeks." That is, collateral circulation was becoming established. "But not completely, for some slowness of speech remained. . . . During the day he had several attacks of vertigo, and afterward hemiplegia. For several hours, however, before distortion of the face or any of the usual symptoms of paralysis had commenced, the only existing symptom was loss of speech. This gentleman died of apoplexy in about two months."

Observe how loose is this last statement. That "apoplexy" may have been due to another embolus, to thrombus, or to hæmorrhage; which we do not know.

"A lady, after an attack of paralysis, lost all power of speaking, but was able to communicate, in writing, her wishes. When, however, doing so, she invariably wrote *no* when she meant *yes*, and *vice versa*. When she wrote 'I wish you to do so,' it was construed conversely. This patient, I am informed, is still living, the singular defect alluded to remaining unaltered."

I had, last summer, a patient under my care who was similarly affected. He invariably said just the reverse of what he intended. Ask him, "Do you like soup?" and if he did like

I answer "No." Thus we see that, instead of above faculty of speech, we may have a simple aberration: partial aphasia.

another curious case from the same book, reported in the same work: A gentleman, twenty-six years of age, proficient in French, Italian, and German, was attacked with apoplexy in about a fortnight, but found himself able to speak. There was no paralysis whatever of the voice or articulation, and he uttered a variety of syllables with the greatest apparent ease; but what he said was quite unintelligible. The case was carefully studied and reported, and the following are among the points noted: He perfectly comprehended every word said to him. He understood in a variety of ways unnecessary to describe. He perfectly comprehended written language. He could read a newspaper every day, and, when examined, he had a very clear recollection of all that he read. He procured a copy of 'Andral's Pathology' in French, and, with great diligence, having lately intended to enter the medical profession.

He expressed his ideas in writing with considerable facility, and when he failed it appeared to arise merely from forgetfulness and not from inability, the words being orthographically correct, but sometimes not in their proper places. Latin was translated accurately. He also wrote correct anatomical questions.

His knowledge of arithmetic was unimpaired. He could subtract numbers of different denominations with great readiness. He also played well at the game of chess, which involves calculations relating to numbers and

his recollection of musical sounds could not be ascertained, knowing the extent of his knowledge of music before the apoplectic seizure; but he remembered the tune of 'The King,' and, when 'Rule, Britannia' was played, he joined to the shipping in the river.

His power of repeating words after another person was unimpaired, but he was confined to certain monosyllables; and, in repeating the alphabet, he could never pronounce *k*, *q*, *u*, *v*, *w*,

x, z, although he often uttered those sounds in attempting to pronounce the other letters. The letter *i*, also, he was very seldom able to pronounce.

"7. In order to ascertain and place on record the peculiar affection of language which he exhibited, Dr. Osborn selected and laid before the patient the following sentence from the by-laws of the college of physicians, namely: '*It shall be in the power of the College to examine or not examine any Licentiate previous to his admission to a Fellowship, as they shall think fit.*' Having set him to read, he read as follows: *An the what in the temother of the trothotodoo to majorum or the emidrate ein einkrastrai mestreit to ketra totombreidei to r fromtreido as that kekritest.*" The same passage was presented to him in a few days afterward, and he then read it as follows: '*Be mather be in the kondreit of the compestret to samstrei amtreit emtreido and temtreido mestreitereso to his efirid tumbried rederiso of deid daf drit des trest.*' Dr. Osborn observes that there are several syllables in the above of frequent occurrence in the German language, which probably had made a strong impression on the patient's memory. But the most remarkable fact connected with the case was that, although he appeared generally to know when he spoke wrongly, yet was unable to speak correctly notwithstanding, as is proved by the preceding specimen."

Returning now to Mrs. W., what prospect can we hold out for her? You will say that, when an affection like this has lasted for ten years, and shown so little sign of yielding, we are not warranted in raising what must be delusive hopes by any word of encouragement. But I do not so regard the case. I should not be surprised if, under treatment, she really recovers the faculty of speech to a very considerable extent. The attempts she has been of late so vigorously making seem to show some gain. Moreover, she appears to be passing through a sort of crisis, indicated by the headaches she suffers from so terribly, especially at night.

How can we hasten the improvement which nature seems already to have begun? What must be our treatment? A great part of it must consist in diligent, persistent exercise

We must be patient, not expecting brilliant results at once, but content if we can secure a steady gain, however slow at first. You know to what an astonishing degree the memory can be cultivated; how firmly things become impressed upon it by dint of frequent repetition. It is said that there is a compositor in London who has set up the Bible so often that he can repeat it from beginning to end. That is a tough story, and I do not believe it myself, though I find it in this book of Forbes Winslow's. But there is no question that feats almost as marvellous have been accomplished. Think only of the way the Homeric poems were handed down from mouth to mouth of the ancient bards. How shall we go to work to discipline the memory? In the first place it is necessary to get a clear understanding of the thing to be remembered. The fault with most persons who say they have bad memories is, that they are deficient in power of attention; they get no definite conception of an idea, and so, of course, cannot recall it. Then, when if we understand the thing, begin to repeat it—not too often at once, for that is fatiguing, but recurring to it again and again. Lord Bacon said that if you would learn a sentence, you should repeat it ten times, twenty would only weaken the memory. That, in the aphasic condition, great improvement can be effected by this means, I have found in several cases occurring in my own practice, two or three of which are still under treatment. One of the best methods, after the patients have made some little progress, is to set them to writing, and then they can pursue the exercise by themselves. I have no doubt that, in this lady's case, if the attempt were made every day for a week to teach her to say one particular word, her own name for example; following this by teaching another word in the same way, and then another, it would not be long before she would have quite a number at command. And then her progress would begin to be more manifest, and seem much more rapid. If it takes a stupid child three months to learn the letter A, it will take him less time to learn B, and far less to learn C, and he will have mastered the alphabet within a year. So, when Mrs. W. has recovered a hundred words, the rest will seem to come of themselves.

The use of the muscles of articulation in this persistent exercise is the very best means of overcoming the remaining ataxia. We have also another means at our disposal to aid in dispelling any lingering paralytic element in the ataxia—the application of the induced or faradaic current to the affected parts. This you have seen quite successful in the case of Wica. We want, also, to enlarge the vessels of the brain, increase its blood-supply, and improve its nutrition. This object we shall seek to effect in two ways: first, by the passage of the constant galvanic current through the brain, applying the poles, one over each mastoid process, or one to the mastoid process, and the other to the back of the neck; second, by giving phosphorus, in the form of the phosphorated oil, five drops in emulsion with mucilage three times a day. Under this treatment—as there is no evidence of present organic disease, beyond this headache, which is a little suspicious, and which I shall investigate more closely—I have strong hope that she may get perfectly well.

LECTURE VI.

FACIAL PARALYSIS.¹

GENTLEMEN: We have before us to-day an example of facial paralysis, an important affection upon which I propose to speak pretty fully. I introduce to you a captain of the gallant Sixty-ninth Regiment, who has been kind enough to come here to-day, although one of my private patients, and I will read the brief history of this case as drawn up by Dr. Cross:

Facial Paralysis.—"Captain T. D., aged forty-three, born in Ireland. On awakening one morning in July he found something strange about his face, but did not realize at that time what it was. On going out, some of his friends told him that his face was twisted, and, on looking in the glass, he discovered that it was drawn to the left side. He applied for medical treatment, four days afterward, when he presented all the characteristic symptoms of facial paralysis. He was

¹ Phonographic report of Dr. John Winslow.

treated with galvanism, both the primary and induced currents. In the course of a week he acquired the power of closing his right eye voluntarily. He took strychnia and phosphoric acid internally. After about twenty applications of galvanism he was dismissed with the power almost entirely restored to all the paralyzed muscles. He is now well, with the exception of slight paresis of the orbicularis oris muscle. At first the induced current did not act, whereas the primary acted from the very beginning."

This affection, known frequently as "Bell's paralysis," was for a long period confounded with some others. It is due to division of the facial nerve, the portio dura of the seventh pair, a nerve formerly regarded as sensitive, and often cut for tic-dououreux, but established as strictly motor by the experiments of Bell and Magendie. Remembering the distribution of this nerve to nearly all the superficial muscles of the face, we can readily understand the symptoms which characterize its paralysis.

The most prominent of these symptoms is the inability to close the eye of the affected side, from the fact that the orbicularis has lost its nervous supply, while the levator palpebræ superioris, supplied by the third nerve, retains its power. The eye waters from being kept constantly open; particles of dirt get into it, for the patient cannot wink to keep them out, to remove them from the surface of the eye-ball where they lodge; the tears, for the same reason, are not distributed over the globe; and they are not conveyed away through the nasal duct, from paralysis of the tensor tarsi, which should hold the lids against the globe to receive them, but flow over the cheek. From all these causes serious inflammation may arise; but, if the patient is sensible, he will avert many of the evil consequences, by frequently closing the lid with the finger, or, if necessary, by keeping it closed with a strip of adhesive plaster.

Again, one-half of the orbicularis oris is paralyzed, and so the patient finds it impossible to whistle or to spit. Indeed, he cannot even retain the saliva upon the affected side, but it constantly drooling out of the corner of the mouth, consti-

tuting one of his greatest annoyances. Captain D. however though almost completely cured, finds this muscle still so weak that, as you see, he cannot get the right pucker for whistle.

The buccinator, too, is paralyzed, and this interferes sadly with the comfort of chewing. The proper muscles of mastication are supplied, as you know, by the third division of the fifth pair; the jaws, therefore, continue to do their work well enough. But the buccinator has to assist the tongue in the important office of keeping the food between the teeth; and, when it is paralyzed, this collects between the teeth and the cheek in a manner extremely disagreeable. This patient will tell you that he used to have to remove it with his fingers.

The mouth, the whole face, in fact, is drawn over toward the sound side, for the muscles of that side find nothing to antagonize them. The effect of this is most marked when the patient opens his mouth, and particularly when he laughs or smiles, and brings the zygomatici and the risorius into play. Look on the affected side of the face, and it is utterly devoid of expression—a perfect blank, no matter what or how strong the emotion. There is not even a wrinkle of the brow, for the occipito-frontalis and the corrugator-supercilii have no power to contract. Romberg has humorously said there is no better cosmetic for old women. From the drawing of the face to the sound side, the tongue, although protruded directly forward appears to deviate toward the side paralyzed.

The facial nerve takes its origin from the posterior border of the pons Varolii, and the lateral tract of the medulla oblongata, some of the fibres of origin being traced to the floor of the fourth ventricle, and even to the lateral column of the cord. It is in reality, then, a spinal nerve, like some others which make their exit through the cranium. It is important that you should consider its course and its connections, for knowledge of these often enables us to locate quite definitely the seat of lesion when it is paralyzed, and this has the greatest influence in determining our prognosis. Leaving the cranial cavity by the internal auditory meatus, it enters the aqueductus Fallopii, a canal hollowed for it in the petrous portion of the temporal bone, and finally emerges from the

skull at the termination of this canal, the stylo-mastoid foramen.

Of its branches of communication we will consider only three, all of them given off in the aqueductus Fallopii, namely, the two superficial petrosal nerves which arise from the gangliform enlargement of the facial soon after it enters the aqueduct, and the chorda tympani, which is given off from the facial just before it quits the canal: 1. The great superficial petrosal runs to Meckel's ganglion, and through this supplies the levator palati and azygos uvulæ muscles. 2. The small superficial petrosal (which some regard as rather a branch of the glosso-pharyngeal, though communicating with the facial) runs to the otic ganglion, which supplies the tensor tympani muscles, and also, according to Bernard, through the auriculo-temporal, presides over the secretion of the parotid gland. 3. The chorda tympani goes to join the gustatory branch of the fifth, and is in part distributed with this to the tongue; but another portion of its fibres enters into the submaxillary ganglion, which presides over the function of the submaxillary gland.

Thus far we have considered only the symptoms due to lesion of the facial after its exit from the stylo-mastoid foramen. Let us now see what additional ones we shall have when the lesion is situated farther back.

First, let it be above the origin of the chorda tympani, but below that of the petrosals. The patient will complain of a diminution, but not a complete abolition, of the sense of taste upon the side of the tongue corresponding to the paralysis. This fact led to the supposition formerly that the chorda tympani was a sensitive nerve; but the experiments of Bernard and others have clearly shown it to be an efferent nerve, carrying influence from the brain, not to it. It is certain that one of its actions is to increase the flow of submaxillary saliva; it innervates the inferior lingualis muscle; and it is probable that it also erects the papillæ of the tongue, and modifies the circulation in this organ. We can account, then, for the diminution of the sense of taste, when the influence of this nerve is cut off, by the dryness of the mouth preventing the speedy solution of the sapid substance, by the want of erethism

of the papillæ, and perhaps also by the changed circulatory conditions.

Next place the lesion back of the gangliform enlargement between this and the meatus internus, we have, of course, the symptoms thus far described, and, in addition, those due to the petrosal connections. One of these is a falling of the posterior palatine arch upon the affected side; it hangs lower than its fellow, and its edge is nearly straight instead of concave. This comes from paralysis of the levator palati, which we found was supplied by the great petrosal through Meckel's ganglion. One of the two little muscles of the uvula being powerless, the other contracts the uvula into a bow, concave on the sound side, toward which its point is directed. The uvula and velum are also pulled *en masse* toward the sound side, from paralysis of the opposing tensor (circumflexus) palati, which, you will remember, is supplied by the small petrosal through the otic ganglion. These deviations, at least, are what we should expect from our knowledge of the functions of these nerves, and they accord with the statements of most observers. Romberg, however, says that the uvula points to the paralyzed side. We shall not be surprised, from the connection of the small petrosal, through the otic ganglion, with the parotid, to find the secretion of this gland much diminished, and, in some cases of intra-cranial lesion of the facial, the patient has complained of extraordinary dryness of the affected side of the mouth. It is probable that we may, as stated by good authorities, have a real, and not simply an apparent, deviation of the tongue, some of whose muscles are said to be supplied by Meckel's ganglion. Another occasional symptom, increased acuteness of hearing on the paralyzed side, Landouzy accounts for by paralysis of the tensor tympani, which we found supplied by the otic ganglion; but Brown-Séquard attributes it to hyperæmia of the acoustic nerve from vaso-motor paralysis.

The diagnosis of lesions of the nerve yet more deeply seated—within the cranial cavity—must depend upon the concurrence of the symptoms of facial paralysis, already noted with those of the affection of the nerves; for a central lesion is not likely to be limited to the origin or the tract of a single

nerve. Just what symptoms we are to look for as diagnostic of the specific seat of a central lesion will be considered when we come to the subject of cerebral hæmorrhage. Some of them we have recently had occasion to observe in a case of cross-paralysis.¹

Among the *causes* of facial paralysis I think the most common is cold. The form of paralysis which it induces is that in which the nerve is affected only after its exit from the temporal bone. The case before you is one of that kind, and it most probably originated in this way, though its history is not clear. This cause often passes unrecognized, for the patient may show no other effect of exposure than the paralysis, as in the case of a young lady up-town, whom I was lately called to see. A very common history—one of which I have seen many examples—is, that the patient was sitting in a draught of air, say before the window of a railway-car, felt a little chilliness of the face, but thought nothing of it, sneezed a few times on going to bed, and awoke in the morning to find his face awry.

Cold may produce its effects in two ways. The first is by directly depressing the irritability of the nerve, as when you paralyze the ulnar nerve by holding the elbow in ice-water. The second and far more common mode is, by exciting inflammation and swelling, and consequent pressure upon the trunk of the nerve or its branches. You know that the facial, just after its emergence from the skull, passes for some distance through the parotid gland, so that any inflammatory swelling of this gland would almost certainly compress it. Inflammation is especially apt to follow exposure in persons of a rheumatic diathesis, whence this diathesis should be regarded as a predisposing cause. Rheumatic inflammation affects, as you are aware, the fibrous structures, among which are the sarcolemma of muscles and the neurilemma of nerves. Inflammatory hyperæmia and effusion in the first of these situations would compress the terminal filaments of the nerve; in the second, might compress its fibres in any part of their course.

But we may have pressure from other causes than inflammation. Women are fond of sleeping with the face upon the

¹ PSYCHOLOGICAL JOURNAL, January, 1871, vol. v., p. 14.

closed hand, and they sometimes have to pay dearly for it by a loss of half their comeliness. New-born children delivered by forceps are not rarely found paralyzed from pressure of the instrument applied over the ear, especially if the extraction has been tedious. We may, of course, have various traumatic injuries in this region.

Deeper-seated lesion of the nerve may arise from the pressure of tumors of various kinds, from syphilitic periostitis in any part of the aqueductus Fallopii, from scrofulous disease of the middle ear finally destroying the bone, from gunshot or other fractures of the temporal bone, etc.

The *pathology* of the affection has been implied in its etiology, which resolved itself, in most cases, into one or another form of pressure upon the nerve, all producing essentially the same effect. You know that, by pressure on a nerve, its irritability is more or less impaired. If you sit upon the edge of a chair in such a way as to press upon the sciatic, your leg and foot get numb, and you lose power over them. If you were not to change your position, you might thus produce permanent paralysis, for I have shown you more than one case of permanent paralysis of the arm from the patient's going to sleep with the arm thrown over the back of his chair, so as to compress the brachial plexus.

As regards *diagnosis*, this affection is liable to be confounded with one other, and only one, that is, paralysis from cerebral hæmorrhage. In paralysis from hæmorrhage the function of this nerve is hardly ever completely abolished. The patient can always close the eye of the affected side, no matter how severe the hæmorrhage, though, why he should be able to do this when he cannot move the other facial muscles, I am unable to tell you. Then, too, other nerves will be found involved. If the hæmorrhage be above the pons, we shall have paralysis of the extremities on the same side of the body as that of the face, that is, on the side opposite to the extravasation; or, if the hæmorrhage be lower down, we may have cross-paralysis. The fifth nerve will be affected, and with it the muscles of mastication and the sensibility of the paralyzed

side of the face. The third will probably be involved, and we shall have divergent squint, ptosis, and dilated pupil; or the sixth, giving us convergent squint. According to the location and extent of the hæmorrhage, we may have any or all of these symptoms combined.

The *prognosis* in facial paralysis due to lesion of the nerve outside the skull is very favorable, if the case is seen early enough. Duchenne says that, when the electro-motor contractility of the muscles is destroyed, it is hopeless to attempt to restore their function. And by this he means susceptibility to the induced current, which is the only one much employed in France, the primary current having been brought into therapeutic use chiefly by the Germans. If Duchenne's statement were correct, then the case before you would have been hopeless, and so would be at least three-fourths of those which come under our observation. For it rarely happens, even when the paralysis has lasted but a few days, that the faradaic current, as strong as you dare to apply it, will induce contraction in the affected muscles. In the captain's case here, only four days after the attack, it would not even cause a tremor. So far as my present experience goes, I should say that, when the muscles fail to respond to every electric stimulus, the prognosis is very bad indeed; but, if you get any reaction, however slight, from a strong interrupted primary current, you have much reason to hope for success. Next year we may find some more powerful stimulus to muscular contraction, but thus far we have nothing better than the galvanic current.

We have seen how the duration of the affection, before treatment is begun, enters into the prognosis from the rapid diminution of muscular contractility. There is another way in which time becomes an important element. A secondary consequence of the paralysis is permanent contraction of the paralyzed muscles from atrophy, and of the muscles on the sound side from lack of their normal antagonism. After this kind of contraction has once set in, it will sometimes go on in spite of all treatment. It becomes of the utmost consequence, therefore, to institute the treatment before such contraction

has commenced, and in this will depend in great measure the encouragement you can give the patient.

When the lesion is deeper seated, the prognosis is, of course, less favorable, but even then it is greatly modified by the location and the cause. You cannot expect to remove an intracranial tumor, or to cure a necrosis of the temporal bone; but if the pressure on the nerve is due to a syphilitic periostitis in some part of its course through the bone, you may hope to remove it by anti-syphilitic treatment. If, then, by the means already pointed out, you have located the disease in the aqueductus Fallopii, and if, at the same time, you can trace a syphilitic history, you will be warranted in speaking far more favorably than when a lesion so located cannot be referred to this as a probable cause.

The *treatment* has been to some extent implied in what we have already said. Its indications are few and simple: to remove the cause if possible, and put the nerve under the best conditions for regaining its lost power; and to preserve the organic integrity and irritability of the muscles until this can take place.

Where we have reason to suspect a syphilitic, rheumatic or gouty origin of the trouble—for gout has been said to produce the affection, though I have never seen it—the causal indication may be met by constitutional remedies addressed to the diathesis.

For the restoration of the nerve-function we can do little beyond securing healthy nutrition of the general system by proper hygiene, and by tonics if necessary. You will find by your text-books, however, that a great variety of means have been tried and are even now employed for the purpose of affecting the nerve. One of those most uniformly recommended is a blister along its course. I used to apply it, but I never saw it do any good. So, too, of liniments, they are utterly worthless. Strychnia applied endermically upon a blister surface, or hypodermically over the paralyzed muscles, I have employed a good deal, but it is of little or no service in the first stage. Strychnia is an excellent tonic, however, and I have found it of value in improving the nutrition of the ner

any presumably inflammatory action has passed off. It is administered as above, in doses of one-thirtieth or even thirty-fourth of a grain; or may be given by the mouth. The patient, after he had been under treatment about two weeks, got the following mixture, which brought up his appetite and strength: *R. Strychniæ sul. grs. ij., acidi phosphorici syrapi zinziberis, aa ʒ ii. M. S.* A teaspoonful three times a day.

A third indication must be met by local means. The best way to maintain the nutrition of a muscle is to exercise it. A considerable advantage may be gained from such passive exercise of the facial muscles as the patient may be unable to make by frequent pinching and kneading. The best means of exercise, however, and the only one we can depend upon, is the electric current, either the induced or the direct primary. The constant galvanic current, more easily employed to improve nutrition by dilating the vessels, and so increasing the blood-supply, apart from the direct contractions produced by its interruption and re-employment.

I am accustomed to try first the induced current, and only resorts to muscular contraction there may be no necessity for resorting to the other. If there is no response to this, then we have recourse to the primary. But the application of the current to the face must be made with great caution. Du-rous destroyed the sight of one of his patients by using too strong a primary current in this situation. I never employ, directly, the current of more than about fifteen of Smee's cells. But, by passing the current through a column of water some three or four inches in height, I have been able to use as many as sixty cells with safety. Whichever you employ, you must secure its action upon every one of the paralyzed muscles; and the best way to do this is to place one pole over the point of exit of the facial from the forehead and with the other (a moist sponge) stroke the whole of the face. Do this three times a week. In the captain's case the primary current was required for about two weeks, or three applications, and then the induced current would act, and need not continue the cure. As almost always happens, the first muscle to recover its function was the obicularis pal-

pebrarum. In the case of the young lady of whom I spoke, and whom I saw in consultation with Drs. Nott and Castle, the induced current acted from the first, and so I was able to prognosticate a speedy recovery. In about a week she acquired the power of closing the eye, and yesterday I learned that she could already execute many movements on the paralyzed side.

This affection is somewhat liable to recur, and with each recurrence is a little more difficult to manage; but the principles and the mode of treatment are precisely the same as in the first attack.

ART. VI.—*Inaugural Address on assuming the Presidency of the New York Medico-Legal Society.* BY STEPHEN ROGERS, M. D.

THE New York Medico-Legal Society having selected me to preside over its meetings, and, as executive officer, to watch its interests during the coming year, I take this occasion to return my thanks for the honor thus conferred; and, if its acquaintance with me renders a further guarantee requisite, to here assure the Society that, whatever my best intentions, aided by the little capacity and industry I may possess, can accomplish for it, may be relied upon. Judging from that which has passed, and in view of this liberal reward for the few and feeble efforts I have heretofore made in its behalf, I am encouraged to expect that whatever I may be called upon to do in the future will be regarded as well intended, and received with the accustomed benevolence of the Society.

In assuming the obligations thus thrown upon me, it is meet, as well as in accordance with the acceptable custom of many of our oldest, most influential, and most numerous societies, that I commence by laying before this Society a chart indicating what I may regard as some of its most conspicuous objects and duties, as well as the routes it is to follow, in its future fields of investigation and inquiry. Though almost the youngest of the incorporated societies in this metropolis, it believed the facts will sustain the declaration that, while a fe-

very much older ones count more numbers, our infant has grown to wellnigh adult strength, and already ranks high among them as regards its public influence and scientific importance.

The pioneer in this department, it has been followed by a society of the same name in the alleged metropolitan city of the civilized world, and now enjoys the regard and deference of the Paris Medico-Legal Society, due from a child toward the parent. *A propos*, I may add that it behooves the parent in this instance to be on the alert, or the child will outstrip it in the race for usefulness and fame.

The first unostentatious meetings of the New York Medico-Legal Society were held so recently as in 1866. Its first constitution bears that date, and announces, among the first of its declarations, that the objects of the Society are, "*the advancement of the science of medical jurisprudence.*"

Although it was not my pleasure and honor to be associated with the founders of the Society, I have, from subsequent knowledge of its workings, learned that their motives in organizing it would perhaps have been more completely expressed, had they declared the objects of the Society to be *the advancement of the art and the science of medical jurisprudence.*

I venture the assertion of the belief that those veterans will all agree that, while they sought to cultivate a more general acquaintance with the great principal truths which might become involved in medico-legal inquiries, and to define the relations of these truths to the established laws of jurisprudence, they also recognized the importance, and even the necessity, of cultivating the art of presenting such truths to courts and juries in an effective way. This was the artistic part of the objects sought.

If I am not in error, therefore, a prominent end they had in view was to utilize material for the instruction and the preparation of physicians for medical experts. Very justly considering it of great importance that lawyers, engaged in cases which demand medical expert evidence, be acquainted with at least some of the chief principles of medicine involved in the inquiries, they sought the fellowship, society, and aid of

legal gentlemen—an element which, I need not say, has done the Society great credit, enhanced its usefulness, and demonstrated the wisdom of its originators.

The mutual education of lawyers and doctors, in subjects liable to become matters of judicial inquiry, and the art of presenting, or making that education available for the practical purposes of those investigations, and thereby securing a proficient body of medico-legal jurists, was, in short, the great objects in the foundation of this Society.

I refrain from commenting upon the progress which has been made toward the realization of those objects; but will venture to remark that there is still a vast field for labor before us.

A just idea of the consummation this Society then sought and still wishes, is expressed by one of its distinguished members: "The immense erudition required to make a skillful witness in medicine, who is to occupy so responsible a position before courts of justice, makes it indispensably necessary for him to possess the greatest measure of proficiency in the matters about which he is called to testify."¹

Proficiency is, beyond a question, the key to the secret of all lasting success of medical experts as witnesses. Doctors, it is said, will disagree, and, unfortunately, it is too often so in courts of justice. By some, this occurrence is attributed to "a want of precision and candor in putting questions."² If it is feared that this want is too often manufactured by the witness himself, as an excuse for a reply suited to a false purpose.

A truly proficient and honestly scientific medical expert will rarely, very rarely, be entrapped into answers which conflict with truth, however adroitly the questions be framed. Therefore, this Society succeeded in sufficiently raising the standard of education in the medical experts, whether they testified for the one side or the other, it will have done very much to remove this opprobrium. It is manifest, however, that the first step toward reform will be to establish the always and, in the end, the most politic rule, to first learn the sul

¹ Ordonaux, Jurisprudence of Medicine.

² Op. cit.

attempting to utter an expert opinion upon it. Two will rarely agree in their testimony upon a scientific which neither understands, and the same discrepancy liable to occur when one witness does, and the other, understand the subject. Our colleagues the lawyers infrequently, however, the innocent or intended cause in the answers of medical witnesses. I have relistened to questions on medical subjects from law-totally pointless, and so regardless of the best establishments in physiology, surgery, or therapeutics, as to defension. An attempt to answer such questions must lead to confusion and disagreement.

Careful medical witness likes to attempt to answer a whose import is not fully comprehended by the putting it. I call upon such as may have had an experience in the matter, to say if I am not correct in stating questions of lawyers, who have taken the trouble to themselves in the scientific principles involved in those, are much more correctly put and more readily and answered? No more need be said of the part our members occupy in our programme. A word to the efficient.

have, with much advantage in time past, and we may do so in the future, resort to the instruction and discipline which moot-courts furnish as a means of cultivating and securing proficiency in our members of both sexes. I assume the responsibility of speaking for the and announce that we do not intend to neglect any which may tend to advance that proficiency.

the very character of its composition the Society has, early period in its existence, been regarded as an appellate tribunal for the decision of questions involving a range of subjects pertaining to medicine, to law, and to ethics. Several such questions have already been referred to it, and they will, in all probability, frequently be referred hereafter, if we are careful to maintain, by the best suggested, the character the Society has hitherto enjoyed should enjoy. In order, however, not to disappoint reasonable expectations of the public, the Society must be

diligent. It must be kept under continual friction, & reflection from its polished shield may be seen from may serve as a beacon to the inquirer after medico-legal ing; and, if I rightly comprehend the scope of its to lead the public to a source of education in some grandest subjects now engaging the serious thought of a civilized world.

By way of preparing the Society for the labor prospect, if it intend to meet these expectations, it appeared to me proper on this occasion to allude to subjects likely, sooner or later, to be brought before it in discussion. It may be well for us, however, to understand that, while we, as a Society, are discussing and informing ourselves in the facts and the principles of these subjects, the community remains unenlightened, and that, as a consequence, when we are prepared to indorse a doctrine, the public is unprepared. But, as such preparation is simply the education, we should not despair when we see opposition arrayed against our recommendations, but should proceed to educate the people by all available means.

Among the first of these important subjects which will engage our attention will, perhaps, be that of the obligation of society to itself in the disposition to be made of persons who have, on the plea of insanity, escaped the punishment prescribed by the law for the gravest of all crimes. Most of the members are aware that measures have been inaugurated to bring this important matter before the public in discussion, with the view of not only educating ourselves, but through this Society to influence the public upon it, but through this Society to influence the public to secure any required legislation.

It will devolve upon this Society to exhibit to the public and to show to our legislators, the fact, that while under existing laws, as well as in the sentiment of many, the authority and the support needed for the protection of the community against such monsters of insane ferocity as who unprovokedly murdered the highly-esteemed Dr. Newburg while at tea with his family, the world is in lamentable need of some more stringent and decisive action touching the disposition of such criminals as Cole, a

as who might be mentioned. Homicidal insanity, instances of provocation, is one of the great criminological problems of the day, and one which this Society must, and make such suggestions about as will lead our to place it where it belongs in the list of crimes, such restraint as the case demands. Shall uncurbed and nurtured anger be permitted, in the same person, to inflict their savage and even fatal manifestations? This is the question toward whose solution our efforts are directed. Influenced by the instruction and guidance, we may contribute much, let us hope that public opinion may ultimately reply to this question in such a way as shall result in the greater security of the many, and may at first seem severe upon the few.

In order, certainly in importance, if not in course, we devote our attention to that vast subject which has engaged this Society, namely, the intellectual status of the homicidal maniac, and the duty of the public toward him. To arrive at the conclusion that appropriate, though in some cases extreme punishment, is an efficient means of protecting the community against the criminal outrages of persons afflicted with the so-called *morbid impulses*, from homicidal and hypochondriacs, and from other forms of uncontrollable impulse to evil, it is difficult to see how we can evade the application of the same principle to the moral correction of this morbid and really uncontrollable impulse to be drunk—an impulse, we all know, which results in ruin to society, and finally in more destruction to life, and sorrow, than all the higher grades of crime. We find this enormous abyss of morbid uncontrollable impulse, whatever the degree of the crime may be. We fully analyze these impulses, so as, if possible, to determine there be any difference, except in the degree of the crime, between the morbid uncontrollable impulse to murder, to steal, or to become intoxicated. We will, not only find that these impulses just mentioned are all bad; but are all subversive of the well-being of the individual and the victim of them; that they are all destructive of public security, and that they are all dangerous to society.

If, therefore, there be any valid reasons why discreetly-administered punishment should exert a salutary control over one or more of these impulses, and not over them all, it will be our duty to duly consider such reasons; but, if it be true, in any one of them, that the simple understanding that crime committed under the impulse will surely be punished, the subjects of those morbid impulses will be the better able to control them, and we must insist upon knowing why the rule is not of general applicability.

Cause must be shown why the principle is not as applicable to the morbid impulse to periodic or continuous drunkenness as it is to a like impulse to suicide or homicide. Assuredly few morbid impulses are more completely beyond the control of reason than are those to alcoholic and other forms of intoxication. Against them, all considerations of parental obligations are impotent; all ties of family and affection are powerless to restrain; every motive of self and social respect, and regard for pecuniary and business interests, disappears before the imperious demands of this ruling and vicious impulse. Many historical examples might be adduced to illustrate the assertion that, in some instances, no motive on earth, nor any prospect of bliss or torment hereafter, was of itself sufficient to influence the helpless victim of this terrible impulse to social disgrace, family ruin, and self-destruction. It therefore seems to me that, if this Society indorse the doctrine that *uncontrolled morbid impulses* which jeopard the rights, interests, and the lives of citizens, and tend to burden the State, must be controlled, and their consequences punished by the State, it will hardly be able to make the uncontrolled impulse to intoxication, in all forms, an exception. I may appear to dwell unduly upon this theme, but in self-defence you will allow me to say that I regard it as one of very great importance, while I know it is one upon which both this Society and the public need more instruction than upon almost any other. Whatever may be public sentiment with reference to the management of the impulsive homicide, it is not yet ready to admit the uncontrollable impulse to intoxication should be treated as a insanity. Should this Society succeed in convincing its members that such is the true treatment, it will still have much to

to enlighten society in the matter. Though great
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ld suggest still another department of mental research
hose singular importance, as well as the comparative
nd even professional ignorance relating to it, renders
itly worthy the deliberate attention of this Society.
o the subject of the moral and criminal responsibility
tally uneducated deaf-mute. This interesting ques-

it may be acceptable, by one who, from a life-long experience has become eminently competent to do so in the most attractive manner.

It would not be surprising to see the discussion, its introduction may give rise to, wander into the domain of the criminal responsibility of too many savages in our midst, who have not received the taming influence of the slightest education either secular or religious.

It has also occurred to my mind that it would not be a fruitless theme for this Society to thoroughly investigate and to promulgate the results of such investigation of the medico-legal evidence of death by starvation and neglect as applicable to infants more especially, though not to the exclusion of any age. This subject has, from time to time, been thrown into much prominence, both here and abroad, coming usually through announcements of boards of health, or through the verdicts of coroners' juries, and it appears to be one worthy of our attention.

By this thought I am led to the utterance of the idea that the relations of society and of science to coroners' inquests might furnish another subject for, possibly, valuable labor on the part of the Medico-Legal Society. It is supposed by many that crime would not be more frequent had we no such institution as a coroner. By others it is believed that about as much would be known of the causes of sudden and violent death were there no such thing as inquests. By still another and more radical party it is declared that, if the whole establishment of the coroner were abolished, the community would be rid of an intolerable nuisance. But, with all warrantable generosity, I may be allowed to suggest that there are reasonable grounds for believing that this department of our government may be improved. Has this Society any suggestion looking to such improvement?

The fact, that there is, and always has been, a most unpleasant conflict of opinion between medical experts and the courts of so-called justice, relative to the mental condition of persons confined or about to be confined in asylums, is well known to most lawyers and physicians. It has occurred to my mind that the Medico-Legal Society of New York might

advantageously devote some of its time and thought to devising a plan by which all of this class of cases may be referred not only to an impartial, but to a thoroughly competent tribunal, thus securing strict justice to all concerned, and protecting the community.¹

It has been suggested to me, by one of our distinguished members, that the subject of the value of voluntary or forced confession, of having been the perpetrator or having participated in the perpetration of a notorious crime, would be an interesting and useful one for us to place upon the records of our transactions, for the future use of science and society. If so appear to you, early occasion will be taken to present the subject to you.

And, finally, I would suggest that one of the great fields of the labors of the Society lies in the direction of legally and definitely fixing the requirements of those who may resume to consider themselves skilled in human medicine and surgery. With rare exceptions, this subject has, in all countries, and amid all degrees of civilization, occupied quite an anomalous position. In nearly every thing else, mankind regard a preparation, by study and practice, necessary to safety and success, and will therefore take especial care to investigate one's claims to confidence, but in medicine these precautions are continually neglected. In all else they will respect the opinions of competent judges, but in the matter of their diseases and their treatment they are extremely liable to insist that they have quite as good a right to an opinion as any one

¹ Since this address was delivered, I have been much pleased to learn that Dr. R. L. Parsons, of the New York City Lunatic Asylum, has advocated a measure well calculated to provide for the necessity above alluded to. I take pleasure in referring those, who may feel an interest in the subject, to Dr. Parsons's paper in support of his suggestion, published in *THE JOURNAL OF PSYCHOLOGICAL MEDICINE* for April, 1870, p. 336. It will there be seen that before the lunatic, who had been discharged by the judge in due process of the law applicable to the case, left the court-room, he "commenced an irrelevant" and insane harangue to the very justice who, a moment before, had said, "If this man could be held, under the evidence, in a lunatic asylum, then a large portion of the citizens of this city should be there too." Three days after, the person whom the judge and several medical witnesses regarded as sane was recommitted to the asylum as insane and dangerous.

else, and to proceed to the practice of that opinion, though they are totally ignorant of even the rudiments of the knowledge on which any right to an opinion could be founded.

And this leads me to suggest that there is another subject allied to this, which has as great claims upon the efforts of this Society as, possibly greater than, any hitherto mentioned, viz.: the relations of the advertising columns of the daily, and other papers, to a large part of the so-called social crime in the community. Is there any responsibility resting on the former, for the production and frightful prevalence of the latter? I distinguish the advertising columns because of the well-known and remarkable circumstances that, while in the other columns we continually meet with accounts of the most terrible crimes against humanity, commented upon in a very sermonizing and highly moral way, if we turn to the advertisements of the very same paper, we will find published the most adroit and wicked information as to the place, means, and manner of committing the identical crime. Can the public regard him who gives the publicity to an announcement that the means of committing a crime may be obtained at certain specific localities, as other than an abettor of the crime? Have we reason to rank that antiquated enemy of all mankind, late of Chatham Street, but now awaiting his trial for so-called social crime, as more criminal than the newspapers which publish his seductive advertisement? Is there a real distinction between the degrees of the criminality and responsibility of the sinners who kept the house, and the one who advertised it? Is he who pastes quack and illicit advertisements on curbstones and on lamp-posts, more disreputable or more criminal than he who publishes them by the thousand from iron palaces?

At what point does the liberty of the press, with its benefits to society, become a public pestilence, an abettor of the most heinous social crimes, and the enemy of humanity?

These are questions this Society may well spend some time in answering.

I imagine that I hear the exclamation, Why add more this already overwhelming amount of material for this Society to work upon? I admit the fact that much, and more than enough, has been suggested; but, it must be obvious, to all who

reflect, that the subjects I have mentioned are but a part of all that will probably come before us. Whether we, as a Society, become famous, or sink into insignificance, will depend upon the zeal, intelligence, and perseverance, with which we engage in the work of settling these and other questions which may be presented. There is no reason to hope that our road will be unobstructed. We must be prepared to meet shocking disappointments and disheartening opposition, not to say any thing of impenetrable ignorance. We are beginners, and are yet small, but let us keep our standard high, our ambition noble, if not great. Let our motto be that so appropriately and beautifully given by the poet, in nearly the following words :

" The lives of great ones all remind us
We may make this one sublime,
And, departing, leave behind us
Foot-prints on the sands of time.
Let us then be up and doing,
With a heart for any fate ;
Still achieving, still pursuing,
Learn to labor and to wait."

ART. VII.—*The Medico-Legal Value of Confession as an Evidence of Guilt.* By WILLIAM A. HAMMOND, M. D., Professor of Diseases of the Mind and Nervous System, and of Clinical Medicine, in the Bellevue Hospital Medical College, Physician-in-chief of the New York State Hospital for Diseases of the Nervous System, etc.

[Read before the New York Medico-Legal Society, February 9, 1871.]

It is a very wide-spread opinion that the confession of an individual accused of an offence is the very best evidence which can be adduced of guilt. This view is not only entertained by the community at large, but is held by the common and statute law, and enforced by numerous judicial decisions. Thus Blackstone declares that " a confession of the prisoner taken out of court before a magistrate or person having competent authority to take it, and proved by two witnesses, is sufficient

to convict him of treason.”¹ In a note, Mr. Archer Ryland states that—

“It appears now to be an established rule, that a full and voluntary confession by the prisoner, of the overt act charged against him, is of itself sufficient evidence to warrant a conviction.”

And again :

“It seems to be now clearly established that a free and voluntary confession by a person accused of an offence, whether made before his apprehension, or after ; whether on a judicial examination, or after commitment ; whether reduced into writing, or not ; in short, that any voluntary confession made by a prisoner to any person, at any time or place, is strong evidence against him, and, if satisfactorily proved, sufficient to convict without any corroborating circumstance.”

And again, in referring to several decisions in support of the practice, Mr. Ryland says :

“A prisoner’s confession is sufficient ground for a conviction, though there is no other proof of his having committed the offence, or of the offence having been committed, if the confession was in consequence of a charge against the prisoner.”

The practice which prevails in courts is stated in all works upon evidence, and is to the effect that no stronger testimony to the guilt of an accused person can be obtained than the voluntary confession of such person.

It is, however, a well-recognized principle that a confession, to be of any legal value, must be made without constraint, and without any promise of reward or immunity. This, however, is quite a modern idea, even in public law, and is not yet entirely obsolete in social life. It is not very many years ago that supposed criminals were tortured till they confessed, or died protesting their innocence ; and it is at this day no uncommon thing in the relations of man, as parent or master to child or servant, to endeavor to extract confession by torture of some kind.

¹ Commentaries on the Law of England, vol. x., eighteenth edition, with the Last Corrections of the Author, and Copious Notes. By Archer Ryland, Esq., of Gray’s Inn, Barrister-at-Law, London, 1829.

The principle upon which the existing laws, in respect to confession, appear to be based is, that the innate eagerness of man to preserve his life, his health, his liberty, or his property, is so overpowering, that it is not at all probable he will say anything calculated to put either of these attributes in jeopardy, if he be innocent, and that, consequently, when he does confess to the commission of an offence, the punishment of which is death, mutilation, imprisonment, or forfeiture of estate, he must necessarily speak the truth.

I propose in this paper to show that it is no uncommon thing for individuals to confess to having perpetrated crimes which they were either certainly or probably innocent, and that there are forces in operation in the human mind which are so prompt to the making of a false confession, even when, by so doing, life, liberty, or property, be put in danger.

Thus we know that, not very many years ago, thousands of individuals confessed to being witches, and to having intercourse with the devil, and this with the full knowledge that such admissions consigned them to torture and death. Many cases are on record in which persons have confessed to crimes for the purpose of saving the really guilty person from punishment. Many others have voluntarily come forward, in times of great public excitement, in regard to some crime, and have apparently courted imprisonment and death by acknowledging themselves to be the criminals, when very slight investigation has shown that they were liars; and physicians constantly meet with patients not obviously suffering from mental derangement, who confess to having perpetrated offences which, really committed, would send them to the prison or the gallows.

A little reflection, therefore, will doubtless suffice to convince all who hear me, that confession, unsupported by collateral evidence, is very unreliable testimony.

A few years ago, my attention was particularly drawn to this subject by a very remarkable case, which occurred in England. The details are so interesting, and present so many points for reflection, that I am sure I will be pardoned for stating them at length:

On the morning of the 30th of June, 1860, Francis Saville

Kent, four years old, was found murdered in an out-house on his father's premises, Roadhill House, Wiltshire. The throat was cut to the bone, and there was a wound in the chest which penetrated to the heart. The corpse was wrapped in a blanket which belonged to the bed in which the child had slept the night before; a piece of flannel, such as women sometimes wear over the chest, was found under the body, and a portion of a newspaper, which had evidently been used for wiping a bloody knife, lay upon the floor. Nothing else was discovered calculated to indicate the perpetrator of the deed, and even the ownership of the piece of flannel could not be traced.

Mr. Kent's family, including servants, consisted of twelve members. The murdered child, a younger one, and the nurse, Elizabeth Gough, slept in the nursery, each occupying a separate bed. Early in the morning the nurse awoke, and found the little boy's bed empty; but, supposing that Mrs. Kent had come into the room and removed him, she gave herself no uneasiness on the subject, but went to sleep again. About half-past six she again awoke, and, arising, went to Mrs. Kent's bedroom, and knocked at the door. Receiving no answer, she waited till her master and mistress had also risen, and then the discovery was made that the child was not in the house. Some time afterward the body was found as I have described.

Before going to bed the night before, Mr. Kent had seen that all the doors and windows of the house were securely closed. The house-maid, in coming down-stairs that morning, had found the drawing-room door and one of the windows open. Supposing that they had been forgotten, or opened by some member of the family for the purpose of cooling the room, she had considered the matter as of no importance, and had, therefore, raised no alarm. There was no evidence of any one having forced an entrance into the house. On the contrary, it was very certain that the murder had been committed by one or more of the inmates, or by some one who must have entered the building and remained secreted in it till the deed was perpetrated. There were no blood-stains in the house or garden, no marks of any struggle, and no noises had been heard by any member of the family. Suspicion fell, by turns, upon Mr. Kent, the nurse, and upon a daughter

ner by his first wife ; but nothing was discovered to justify the committal of either for trial, though one or two unexplained circumstances which, in of some, connected the young lady with the murder had been heard to utter expressions of dislike against the child, and had, on several occasions, manifested the degree of jealousy in regard to him. A night-dress was missing, and no satisfactory account was given of the theft. But there was nothing more. As she had never shed tears when informed of the cause of her trial, she had borne herself throughout the examination with fortitude, and apparently with the utmost consciousness.

Two years subsequently she went to school, and then, entering a semi-conventual order connected with the Church of England, remained in seclusion till the spring of 1865, when she suddenly came forward, confessed herself guilty of her murder, and was committed to take her trial for the same. The trial took place. She pleaded guilty to the indictment on her plea alone, without any further inquiry, and the case being sent to the jury, she was sentenced to

In the report of the trial I make the following ex-

At nine o'clock the learned judge took his seat on the bench, and the prisoner was placed at the bar. She stood meekly, with her eyes cast down, and her hands clasped before her.

After having been proclaimed, the deputy clerk of the court said :

"I charge you, Emilie Kent, you are charged with the wilful murder of Francis Saville Kent, on the 29th of June, 1860. Do you plead guilty, or not guilty ?"

SHE (in a low tone)—'Guilty.'

J.—'Are you aware that you are charged with having murdered your husband intentionally, and with malice, murdered your husband ? Do you plead guilty or not guilty ?'"

She made some answer, but in so low a tone that it was scarcely heard.

"JUDGE—'I must repeat the question: You are charged with having wilfully, intentionally, and with malice, killed and murdered your brother. Are you guilty or not guilty?'

"PRISONER (in a low tone)—'Guilty.'

"JUDGE—'The plea must be recorded.' The plea was, accordingly, recorded.

"MR. COLERIDGE [one of the counsel]—'Before your lordship passes sentence, I desire to say two things: First—solemnly, in the presence of Almighty God, as a person who values her own soul, she wishes me to say that the guilt is hers alone, and that her father and others, who have so long suffered most unjust and cruel suspicion, are wholly and absolutely innocent; and secondly, that she was not driven to this act by unkind treatment at home, as she met with nothing there but tender and forbearing love; and I hope I may add, that it gives me a melancholy pleasure to be the organ of these statements for her, because on my honor I believe them to be true.'"

The learned judge—evidently a kind and generous-minded man—then assumed the black-cap, and, with great feeling, in which the prisoner joined with hysterical sobs, sentenced her, as his duty and the law required. And thus, without any inquiry into the character of the influences which had been brought to bear upon her, the tendencies of her disposition while in the religious institution, the sanity or insanity of her mind, her antecedents, or any other point which might have served to throw light upon the case, to lessen her criminality if really guilty, or to weaken the force of her plea if innocent, Constance Kent left the court convicted of the highest crime known to the laws of man. If innocent, her case is one more added to the long list of others—monomaniacs, ecstasies, enthusiasts, hysterical persons, and liars, who have confessed to the commission of offences which they did not perpetrate; if guilty, she is, so far as I know, the solitary instance of an individual confessing to a crime, and being sentenced to death upon no other evidence than that of admission. Men and women, before this, have, in the face of overwhelming testimony against them, or while in a drunken debauch, or on their death-beds, or standing on the scaffold, with no hope of escape, or unintentionally, like the robbers and the cranes of

bycuss, confessed their crimes; but, if any criminal of sane mind has ever yet voluntarily supplied all the evidence which could consign him or her to an ignominious grave, the case has escaped my observation.

Such are the main facts immediately connected with this extraordinary case, and which is rendered still more extraordinary from the real or supposed discovery of the criminal. That she may have committed the murder is beyond question; that she did commit it is, in my opinion, a matter of grave doubt.

At the time of the murder, Constance Kent was in her seventh year. Her mother had died a lunatic several years previously; and she herself, though described as a girl of a firm and generous disposition, was considered to possess a rather dull and sluggish intellect. At the time of the trial it was stated that she was an exceedingly plain-looking young woman, with a broad, full, uninteresting face, which wore more an expression of stupid dulness than one of intelligence. She had full, large eyes, glanced uneasily around her, as if expecting some danger, and had, apparently, none of that cunning and shrewdness which it would be supposed she must necessarily have possessed.

When arrested soon after the murder, her behavior was, as we have said, in the highest degree admirable. She evinced a proper amount of feeling, denied all knowledge of the crime, and, when questioned in regard to the dead child, said: "The first time I saw him was in the evening when he went to bed. He was a very merry, good-tempered lad, and fond of romping. I was accustomed to play with him often—I had done so on that day. He was fond of me, and I was fond of him." Did she commit the murder? What evidence was there to establish the fact beyond her own voluntary confession? It may easily be assumed that there was none. None was brought against her at the trial, and it is not to be supposed that in a country like England, where the law is rigidly enforced against peer and pauper alike, and in which the regard for human life is at its maximum, she would have been allowed to live quietly for five years undisturbed by those who had never lost sight of the murder. The great mass of the people

who read about the affair said, "What more is required? She has confessed herself to be guilty, and therefore she must be guilty." Let us see what warrant there is for such an assumption.

After two years passed at a boarding-school, during which it was a common subject of remark that she was very eccentric in her demeanor, Constance Kent entered St. Mary's College, Brighton, a sort of hybrid convent with a rector and a lady-superior. Here she was undoubtedly subjected to the action of influences calculated to exalt her cerebral sensibility, already abnormally heightened by hereditary predisposition and the action of the causes to which I have already alluded. Let us suppose, for the sake of the illustration, that she entered the *quasi* convent thoroughly conscious of her innocence. She knew that she was suspected. She had been arrested as the murderess, but discharged for want of evidence. During the two years or more subsequently, she had heard numerous disputes among her school-fellows in regard to her guilt. The nurse had been arrested, and, though also discharged, labored under the suspicion of being the criminal, and was in consequence unable to procure employment. Whisperings, too, which had reached her ears, had been going on against her father. It was said that he had had an intrigue with the nurse, and had killed the child—who had awoke while he was in the room—to save his own reputation. Crushed to the earth by these reports, he had buried himself in obscurity, a broken-hearted and a ruined man. Brooding over these thoughts and many others that must have forced themselves upon her, taught that self-mortification was one of the highest privileges of mankind, and thinking for years about the horrible events of that dreadful night, would it be a subject for astonishment if Constance Kent had come in time to think herself the murderess, and been brought to believe it her duty to relieve her friends from suspicion, and to save her own soul by taking the guilt upon herself? Had she not before her the example of her Lord and Saviour, who came down from heaven and assumed the sins of a wicked world in order that man might be saved? Do we not know, by our daily experience and observations of our fellow-men, that the mind, by constant

ining the most preposterous ideas, finally accepts them ? It is said, and doubtless with truth, that the most improbable story, if frequently told, is eventually so impressed upon the mind of the relator that he believes in its genuineness.

ere dream is, in certain states of the system, undistinct from realities. A patient, a lady with deranged mental function, informed me a few days since that she went in the night and gone to visit a gentleman of her acquaintance, who lived in a distant part of the city, and had been in his house all night. Thorough inquiry showed beyond the possibility of doubt that there was not a word of truth in her story ; that she had not left the house at all, and that the gentleman in question was not at the time in the house. Doubtless the whole series of events had no other origin than a vivid dream. In the middle ages spontaneous confession made many a woman consider herself subjected to the influence of the devil. We know, too, that most children are incapable of discriminating between the phantoms of dreams and actual events, and they are frequently punished when they firmly believe they have spoken the truth. I often had children give the most circumstantial and accurate accounts of their interviews with fairies and ogres, whose accounts were clearly attributable to dreams.

Desire for notoriety will sometimes be the predominant cause causing a false confession. A few months ago I was called by Colonel Whitely, the chief detective officer of the New York Police Department, to visit, in the Tombs prison, a man who had confessed himself to be a member of a gang of counterfeiters. The individual had written a letter to the Secretary of the War, in which he detailed in the most consistent and minute manner the organization of the band, and as members of the gang gave the names of the most eminent and respectable of the United States, of both political parties. His statements were believed, and Colonel Whitely was directed to handle the whole affair with the utmost secrecy and caution. Colonel Whitely, with the perspicuity for which he is known, had his suspicions excited that the man's story was a fabrication. Nevertheless, the evidence the fellow had sent

to Washington was so far credited that it was under consideration whether or not the alleged members of the band, including governors of States, senators, representatives, high officers of the army and others, should be arrested. At that juncture, Colonel Whitely requested me to examine the man. I found him perfectly coherent, but wavering and contradictory in his statements. Examination of the skull showed that he had received a wound from a musket-ball, and this, with the facts that he did not sleep, that he had cerebral congestion, and was evidently laboring under a delusion, convinced me that he was a fitter subject for the lunatic asylum on Blackwell's Island than for a prison, and I accordingly had him sent there. In this case a desire for notoriety and a self-inflation resulting from the association of his name with others of exalted station had been the primary force of action, and had eventually rendered him insane.

A mere confession—especially one made under such circumstances as that of Constance Kent—is not sufficient evidence of guilt. We know that men and women have often avowed a criminality which did not exist, and which they have persisted in claiming for themselves till they yielded up their lives on the gallows, or at the stake. Do we believe that Father Gaufridi was guilty of bewitching more than a thousand women, and of worshipping the devil, because he confessed these things, and was burned at the stake in expiation of his self-imposed crimes? Do we credit the acknowledgment of Sister Marie de Sains, of the Briggettine convent at Lisieux, that she had committed hundreds of murders, strangled numberless children, ravaged graves, breakfasted with devils, and perpetrated thousands of unheard-of sacrileges and barbarities?

In those days a woman who confessed to being a witch was put to death without fail, and yet we read, in the book entitled the "*Malleus Maleficarum* ; or, the Hammer of the Sorcerers," that a woman who was in the hands of the inquisitors assured them that she repented really and bodily whither she went, and that, even were she shut up in prison and strictly guarded, and let the place be ever so far off.

The inquisitors ordered her to go to a certain place

to speak to certain persons, and bring back news of them. She promised to obey, and was directly locked up in a chamber, where she lay down extended, as if dead. They went into the room and moved her, but she remained motionless, and without the least sensation, so that when they put a lighted candle to her foot and burnt it she did not feel it. A little while after she came to herself, and gave an account of the commission they had given her, saying she had had a great deal of trouble to go that road. They asked her what was the matter with her foot. She said it hurt her very much since her return, and knew not whence it came.

Then the inquisitors declared to her what had happened—that she had not stirred from her place, and that the pain in her foot was caused by the application of a lighted candle during her pretended absence. The thing having been verified, she acknowledged her folly, asked pardon, and promised never to fall into it again.—(*Colunt.*)

The value of confession as an evidence of guilt is overestimated, and should, in my opinion, never be accepted, unless confirmed by collateral evidence. The practice of requiring an accused person to plead at all is in itself absurd, and contrary to sound psychological science. It is the business of the government to prove the offence irrespective of what the prisoner may say; and this was not done in the case of Constance Kent.

Moreover, due weight has not been given by the law to those inherent forces of our organization, those mysterious promptings of our nature, which so often cause us to take dangerous risks and which, as we have seen, may urge to a false confession. When an idea of the kind has taken possession of the mind, it rules with overwhelming power.

In speaking of the absurdity of employing torture to get at the truth, Beccaria, in his remarkable “*Essay on Crimes and Punishments*,” says: “Every act of the will is invariably in proportion to the force of the impression made on our senses, and the sensibility of every man is limited. The impression of pain, then, may increase to such a degree that, occupying the mind entirely, it will compel the sufferer to use the shortest method of freeing himself from torment. His answer, there-

fore, will be an effect as necessary as that of fire, or boiling water, and he will accuse himself of crimes of which he is innocent, so that the very means employed to distinguish the innocent from the guilty will most effectually destroy all difference between them."

Can there be a doubt that what is true of bodily torture is equally applicable to the mental torture of an irresistible and ungratified desire, such as may have filled the mind of Constance Kent? Here I might close these very imperfect remarks, but I feel impelled to say an additional word in regard to the principal case upon which they are based. Into the question of the guilt or innocence of Constance Kent I have not entered; I have only contended that her criminality is not satisfactorily established by her confession. But, from the stand-point that she actually did commit the murder, a few points suggest themselves:

It must be recollected that Constance Kent at that time was of an age when women are peculiarly sensitive, and, as it were, instinctive in their feelings. Their likes and dislikes are conceived upon the most trivial and often most erroneous grounds; they are subject to very whimsical and really ungovernable fancies; their nervous systems are disordered, and thoughts may be conceived and acts committed which, at a subsequent period, would fill their minds with horror. Numerous instances of the kind have come under my observation, and physicians generally will doubtless recognize the truth of what I say. Though, in the great majority of young girls who are brought up under proper influences, these psychological evidences of the great change the organism is undergoing rarely make themselves manifest to any but those with whom they are thrown into the most intimate relation, this is, unfortunately for human nature, not always the case. A slight derangement in the physiological processes which are going on may produce simply an appetite for chalk or slate-pencils. A transient vertigo may cause a radical and permanent change of character. An almost unnoticed congestion of the brain may prompt to the commission of a horrid crime. Even an adult man is never the same after as before an attack of cerebral congestion or hæmorrhage. From having been kind, considerate, and

nly, he may become changed to a being of morose
al instincts, which it is impossible for him to restrain
ounds. With how much greater force would these or
influences act upon the impressionable nervous organ-
young girl when at the most susceptible and critical
er existence! To hold her legally, morally, or phys-
y accountable for their effects, would be about as
and as logical as to blame her for having a club-foot
orted face. And, if, in addition, we find her heredi-
edisposed to insanity, we should still less be disposed
e in her criminality. Society might punish her for
protection, but punishment in such a case would be a
evil.

period of her life, therefore, when Constance Kent re-
e most tender and considerate care, she was without
ort and counsel which none but a mother can give.
e influence of morbid ideas conceived by an unhealthy
, according to her confession, perpetrated a deed the
of which subsequently excited in her no other emo-
those of anguish and remorse. That a child of her
r of intellect should have murdered her brother so
as to leave no traces to connect her with the act,
ave undergone the most searching examination with-
shadow of a suspicion being proved against her, and
r five years retain in her own bosom the great secret
e, can only be explained upon the supposition that
from an insane and irresistible impulse, and that the
which enabled her to baffle the officers of the law was
bnormal in its character.

feeling which prompts us to sympathize with this un-
girl may be called maudlin sentimentality and the
of false science; but every physiologist knows that it
upon those mysterious but nevertheless well-recog-
s of life which, if, as is necessarily the case, of no force
of justice, organized for the protection of society, are
l with those who are not altogether ignorant of the
which exist between mind and matter, and will doubt-
aken into consideration by the infallible and merciful
hich created them.

Yet her punishment was not altogether untempered with mercy; for, in deference to the known feeling on the subject, was first commuted to penal servitude for life, and subsequent to transportation for the same period.

CONTEMPORARY LITERATURE.

THE first volume of "The Origin and Development of Religious Belief"¹ is an attempt to determine, on purely positive grounds, the religious instincts of humanity; and the second volume is an endeavor to prove that Christianity meets and fulfils those instincts. The author informs us, at the outset, that he does not assume either the existence of a God, or the truth of revelation; consequently, the Bible is not quoted as authoritative, but only as an historical narrative, open to question and criticism. The first part of the work deals with matter and its properties; the development of vegetable and animal life; the mode of cellular growth; the nervous structure of man and the lower animals, and gives a brief summary of the anatomy of the brain as the seat of emotions and ideas, noticing the influence of mind on body and of body on mind. Intelligence is shown to be as much a necessity of man's existence, as instinct is of the existence of the brute. Instinct is a requisite and a measure of well-being of the animal, and the faculties of man are adapted to his wants, but they also go beyond his sensual necessities, and open to him a series of pleasurable impressions having no connection with his merely animal life. Unless there were another and a higher consciousness in man, all those instincts would be utterly waste and profitless. There is an antagonism between the higher faculties and the lower instincts, and as one is developed the other is enfeebled; and mental activity uses up vital force that would otherwise be expended in reproduction of animal life. The fact of man's capacity for spiritual development is taken as proof that some unknown spiritual end is obtainable. As the animal instincts tend to preserve and perpetuate the species, so must the higher instincts indicate a state of perfection in another stage of existence. Hence it is argued that savage life tends to raise the *physique* of the species while civilization has a tendency directly opposite, and propagates

¹ The Origin and Development of Religious Belief. By S. Baring-Gould A., author of "Curious Myths of the Middle Ages," "The Silver Store," etc. I.: Heathenism and Mosaism. Part II.: Christianity. New York: D. Apple & Company, 1870.

ease and malformation. "Every year that intellectual activity advances, reproductive activity falls back." The amount of happiness in a race not highly civilized is greater than that in an over-civilized race.

The religious sentiment of man is taken as a fairly presumable proof that there is something to be obtained beyond mere worldly good. Every other instinct has some positive aim and object, and it would be against the analogy of Nature to suppose the religious instinct an exception. It is simply a desire to follow out a law of our being, leading to the perfection and happiness of the creature. It is the "voice of the spiritual nature clamoring for food necessary for its life." It is only in its exaggeration that it can lead to error, as when it becomes superstition or fanaticism. Among the instincts that distinguish man from the brute creation, the author gives prominence to two—the craving to discover a cause for every phenomenon, and the prosecution of an ideal of perfection. The belief in causation led man, recognizing the power of his own will, to attribute that force to some higher cause, and such was the origin of the idea of God. All men in all ages have drawn substantially the same inference, whether they imagined the cause to be one God or many. The idea of perfection arose from the recognition of the distinction between animal and spiritual life, and the antagonism between them. The imaginative faculty, which is peculiar to man, led him to picture an ideal perfection, whether of power, wisdom, justice, or beauty. Man has rooted in him a conviction that he has a spirit capable of growth, and this conviction the author believes cannot be illusive. The idea of the immortality of the soul the author thinks even more widely spread than that of the existence of one or more Gods—the conception of a deity requiring some mental exertion, while that of immortality requires none. The notion of annihilation could not be entertained by a philosophic mind. Man believes in immortality from the instinct of self conservation. The instinctive clinging to life is especially strong in man, and hence he seizes eagerly on any idea which tends to dispel the dread of death. Another reason given for this belief is that such a doctrine alone can reconcile the strange anomalies of life by projecting thought into a world where all shall be made right. The belief in future rewards and punishments sustains men under the most intolerable wrongs and oppression. The particular forms which the idea of immortality assumed in different minds, and among different races, are dwelt upon at some length. The last of the theories, the resurrection of the body, and its union with a purified soul, the

author believes to be peculiarly Christian. He thinks also that the idea of immortality has exercised a tremendous influence, not only in leading man toward civilization, but also in degrading him, through the superstructure raised upon it of angelology and demonology.

The primitive ideas of the Deity form the subject of a chapter giving much interesting information regarding the early races of mankind, and the vague superstitions that prevailed for many centuries. The author then takes up the various phases of religious development, showing how religion has gradually been formed by a natural process of growth. It is claimed that religion is the synthesis of thought and sentiment, always reposing on some hypothesis. Every religion exhibits a double tendency, one liberal, the other conservative. The powerful influence of habit in the formation of religious thought is pointed out, most men asking what others think right, rather than what *is* right. Four stages of theocratic civilization are named: the divine age, when God was King; the sacerdotal age, when the priest was king; the monarcho-sacerdotal age, when the king was priest, and the bibliocratic age, when the authority was lodged in a charter. Among the Hebrews the theocracy passed successively through all the four stages. In Europe there has been a perpetual clashing of antagonistic forces, resulting in an enthusiastic passion for truth.

The history of polytheism is then clearly sketched, and the difference pointed out between polytheism and pantheism. Mythology, we are told, was not the invention of priests; the priest merely believed, with greater exaltation, what was believed by the mass of his nation. The origin of idolatry, and its various forms, are made the subject of a special chapter. Some object, on which the senses could lay hold, was essential to worship, and differed little in fact from the worship of an idol. The formation of the idea of a personal God is the making of an image, though not necessarily a graven image. The difference between an idol and a fetish is very marked. The idol is a symbol, but the fetish is "a concentration of spirit or deity on one point." The principle of fetishism is that of centralization, attributing a fictitious value to some object of no demonstrable importance. A recognition of this principle is found in the idea of sacredness attached to temples, shrines, or sacred spots. The Christian who takes off his hat on entering church is a fetishist. The vast debt humanity owes to fetishism is pointed out by reference to the domestication of plants and animals. The defect of fetishism is its adaptability to charms and necromancy. A development of the idea led to symbols;

and idols are symbols of ideas. To symbolism we are indebted for the arts of painting, sculpture, and writing.

An outline is given of the theocracies that have ruled mankind in various periods of history, and their pernicious influences on individual rights and liberties are shown. Man's originality was subjugated by the discipline which reduced men to mere machines, while at the same time it gave an immense power to the rulers, and rendered possible the execution of stupendous national works. Some organization is admitted to be essential to the preservation of any religion, but the defect of theocracies has been an exaggeration of a necessary condition.

In regard to the ethics of religion, the author claims that the moral sense is certainly an intellectual faculty, and that the capacity to distinguish right from wrong depends on the quality and education of the mind. Man has the power of benefiting or injuring his fellow-men, and he has even the will to destroy, for the mere love of destruction. But, having also social feelings, he discovers that he must restrain his feelings, and make some sacrifices for the general good. "The community must protect the rights of its members. When one has broken through the rights of others, and has suffered for it, he conceives the idea of wrong. Thus the idea of wrong is associated with the fear of punishment; and the idea, combined with the sentiment corresponding to it, forms what is called conscience." Ideas of morality would therefore depend on the laws, and regulations, and habits of the community of which man formed a part. Man's ideas of duty would thus begin with the community, and would be subsequently extended to his God and to himself. He would discover that he was happier when he yielded to his spiritual instincts, than when he gave the rein to his sensual appetites. The great defect of the ethical doctrine of Greek polytheism the author conceives to be, that it viewed man wholly in relation to other men, and not at all in relation to himself. Consequently, there was no morality but that which was political, and licentiousness knew no bounds. This defect is supplied by monotheism, which gives man a law within himself. The most important part of ethical systems, for the purposes of the student, is the object aimed at. Mohammedanism offers man temporal and eternal happiness, but gives him no motive to impel him toward it, for his fate is predetermined. Pantheism has the same defect, and reduces man to a mere machine. In Judaism the motive force is the fear of God, and the object temporal happiness. Polytheism offers temporal happiness as a reward of subordination to the well-being of the State. The key to all moral activity the author believes to be the desire to

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attain the greatest possible amount of permanent happiness. Self-love is thus the mainspring of all action, and virtue is the judicious selection of that course of action most conducive to permanent happiness. Vice is the adoption of an opposite line of conduct. If man abandons sensual pleasures for those that are intellectual, he is virtuous, because the sum-total of intellectual happiness is greater than the sum-total of sensual happiness. In other words, virtue is intelligent selfishness, vice ignorant selfishness. It is laid down as an axiom that the state of our conscience at any given moment is the measure of our knowledge. "If man were gifted with such faculties that he was able to view himself in all his relations at a glance, he would never transgress a law of physics, social economy, or religion, and there would be no such thing as immorality; pain would never be felt, because man would know perfectly how to avoid it. But, as man is not so constituted, an appeal is necessary to his conscience—that is, his fears, and hopes—in order to prevent the utter disorganization of society, and the disappearance of morality." The question that naturally arises here, in the mind of one not versed in the mysteries and sophistries of theology, is, why the Creator did not endow mankind with these most desirable faculties; but this is foreign to the argument of the author, who sums up this portion of his subject by the proposition that, if there be a God, man must bear relations to Him, and owe Him duties; but what those duties are can only be ascertained by a revelation—why only by a revelation, we are not informed.

A full and satisfactory review is given in the succeeding chapter of the progress of the mind, with civilization, toward the monotheistic ideas which at present forms the basis of the creed of a large section of the human race. This seems to the author the natural result of the study of Nature, and the observation of the uniformity that prevails in all natural phenomena. Not quite so clear are the author's views on the conception of a corporeal and a spiritual substance, but we are told that, "the idea of spiritual substance is the basis of theism." The deism of Mohammodanism is considered imperfect, because it annihilates morality by placing a wide abyss between man and the Creator, and making the latter an unreasoning tyrant, before whom man is abased and prostrate in utter helplessness. This was also Calvin's idea, and many quotations are given to show that Calvin rested moral action solely on the will of an all-powerful autocrat. The conclusions drawn by the author are, that absolute theism is intolerable to the instincts of humanity, and that pure monotheism resolves itself into fatality, and has a tendency to narrow and destroy the mind. W

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he deems necessary for the conservation of society is, a code of intelligible laws of morality, applicable to every-day life, and based on irrefragable authority. This code he believes can be obtained only by revelation, or by induction from accurate observation; and he believes it must be enforced by state or divine authority.

In tracing the history of philosophic speculation, it is shown that religion and philosophy are inseparable—the one representing sentiment, and the other reason; neither is complete or satisfactory without the other. Some space is devoted to a synopsis of the respective views and speculations of philosophers, from those of Greece and India down to those of our own day. This review exhibits the oscillations of thought between theism and pantheism—the existence of God apart from matter, or as a part of it. Each view, the author suggests, may be an aspect of the same truth, so that possibly each may be true in its affirmations, and false in its negations.

The idea of evil is said to be a generalization from the perception of pain, passing through many grades, and arriving in time at the conception of a devil of almost unlimited power. In this connection, and elsewhere, the writings of Theodore Parker are quoted in regard to various theological dogmas. The author does not believe evil or pain to be measured out according to the violation of Nature's laws, because it is often seen that the evil falls on the wrong person, or it falls in a proportion by no means commensurate with the cause that produced it. Nor is it at all evident that it makes the sufferer either wiser or better. He says, "The fact is, that there is a vast amount of pain in the world which is not remedial, and much that is remedial is not so to those who are racked by it." Hence the conception of a malicious being, who became, as God became the perfection of goodness, the perfection of evil.

Closely allied with the religious instinct is that of asceticism. There is scarcely a religion, we are told, of ancient or modern times, that does not recognize asceticism as an element in its system. By asceticism is understood abstinence from lawful pleasures, the subordination of certain faculties to others, and the restraint of certain propensities. The practices and rules of the various religious systems in this particular are dwelt upon in detail, and make a very interesting and instructive history. The influence of asceticism is shown to have been of tremendous power. All great religious movements have been due to ascetics. The reason given by the author is, that the vital energy accumulated by ascetics is expended in exploding and wrecking old constitutions that new ones may rise upon their ruins. It is

"the withdrawal of vital force from the muscles, that it may be exerted in the generation of brain-matter." This theory appears open to some objections, as, for instance, when the ascetic limits his diet and renounces the healthy gratification of the appetites and senses which is necessary as much for the sustenance of brain as muscle. The great founders of Protestantism the author finds to have been ascetics, except Luther, whom he regards as a man of coarse and vigorous animalism, but of immense spontaneous power. Right or wrong it is claimed that asceticism, from physical reasons, is, and must always be, a positive power. A contrast is drawn between Buddhism and Christianity, in the matter of asceticism and of mysticism. The ethic code of Buddha is ranked hardly lower than that of Christianity, but it is a philosophy and not a religion, and hence it does not give scope for the development of the affectional instincts, and fails to meet the exigencies of human nature. Mysticism is regarded as the exageration of sentiment, rendering the intellect a mere slave to sentimental vagaries. All religions, we are told, have of necessity some share of mysticism, which renders them attractive to women and young men; but the true mystic is described as a being whose intellect must be either atrophied or kept systematically in abeyance. "Religion, to rise, must mount on two wings—Reason and Sentiment; and he who attempts to rise on one, remains fluttering vainly on the ground." Here the author takes occasion to lament the sad degeneracy of the saints of the Catholic Church, from men of earnest piety and great intellect to crazy nuns and sentimental boys.

The origin of sacrifices is shown to have been the idea of reparation for injury, and this law of social life was the basis of criminal law. A sketch is given of the sacrificial customs of the ancients, who sought to appease an offended Deity as they would an injured fellow-man. For all favors asked of the gods, it was supposed that an equivalent in the form of a sacrifice was always necessary. As civilization advanced, bulls and goats were substituted for human beings; but the idea of expiation or compensation remained the same. Speaking of the present time, the author says: "The sacrifice of all excess is the science of life; the sacrifice of the present caprice and pleasure insures future prosperity; the sacrifice of the straggling tendrils of sentiment strengthens the vital stem. Far from destroying the divine forces of life, sacrifice gathers them up, unites, and maintains them. The next subject treated of is prayer, which the author regards with respect. Prayer he considers the liberation of force, relieving the emotions, as passion is relieved by an outburst of anger. Therefore, to the

nature which combines intellect and sentiment, prayer becomes a necessity, and he who prays finds peace. We are justified in concluding, says the author, "from the presence of the instinct of prayer, that the Deity addressed has a real existence."

An important point is made in the chapter on human ideals. It is shown that the ideal set up by a nation has had a powerful influence in raising that nation toward the ideal, whether it be one of physical strength, of bravery, beauty, or of any other quality possessed in a degree far above the average. Hero-worship may thus be powerful for good, as an acknowledgment of gratitude, and a recognition of superiority. It provides men with models of excellence, and stimulates them to imitation. Thus Christ is recognized as the type of male perfection, and it is only fair to woman that Mary should be made the ideal of female perfection. Where there is no female ideal, says the author, woman is of no account. In this we think he is entirely mistaken, but it is very plain that in some of his religious ideas the author is governed by the sentiments rather than the intellect, and he moves his own argument concerning the mystic depths to which the sentiments may lead.

The second volume of the work before us is devoted to Christianity, and the author undertakes to prove that the whole scheme of Christianity is contained in the "great facts and laws of human nature and the universe." The authority of the Bible, and that of the Church, he believes to have been proved fallible, and hence the necessity of placing theology on facts in our own nature. He says men have revolted against the Church, and now revolt against the Bible, so that dogma needs to be placed on some more unassailable foundation. He endeavored to demonstrate in his first volume that the earlier religions were imperfect, because they maintained only one truth, or one aspect of the truth. What mankind needs at the present day is the coordination of all aspects of the truth. "Scripture and tradition have been the rope and plank to man drowning in a flood of doubt. Scripture has yielded, tradition has given way—must he sink? By no means. The principle of Christianity is within him—let him strike out and gain the shore."

The opening chapter is a rehearsal of the facts regarding the dual nature of man, and the evident autonomy which exists in all his relations, and concludes with the proposition that this autonomy must change into antagonism, unless the existence of a God is admitted as fundamental, indemonstrable axiom, "the basis of all certainty, the reconciler of all autonomies." The object of religion, then, is to syn-

thesize, as the object of science is to analyze. In man's consciousness and his quenchless thirst for the ideal he finds his strongest argument for the existence of the Infinite, or God; and, *because* we cannot solve the enigma of our own existence without assuming the existence of a Deity, therefore we are bound to make this admission. We are sure of the existence of the finite, and that implies the existence of its contrary, the infinite; but, as reason deals only with the finite, it is idle to ask for a demonstration of God's existence. It is admitted that in discussing Christianity "some premiss must be taken," and the author adopts the method of Hegel, and proceeds to build his ingenious and elaborate superstructure of faith on the assumption that there is a God. He admits, however, that every man's private judgment is for that man the only criterion of what is true, and, in his statement of this proposition, he is as liberal as the most enlightened rationalist could desire. "To every objection and criticism I reply, How otherwise can I judge, except according to my feelings, and my knowledge? In vain is it argued that we are to give up our private judgment to a revelation. We can only admit the authority of a revelation by an act of our individual judgment." We cannot too emphatically indorse this sentiment, which gives us the liberty of differing very materially from Mr. Gould in many of the conclusions to which he is led by his evident taste for the mystic.

Having shown that there is in the world, and in man himself, universal autonomy, and that, without the idea of God, it is impossible to harmonize conflicting elements, the author proceeds to the preliminary hypothesis of Christianity. It is assumed that God created the world, not for any reason of His own, nor for any need He could have felt, but with regard to the creature alone. This exercise of will is defined as the supreme manifestation of love, and this, in the author's opinion, "solves the enigma of creation." How it solves it we confess ourselves unable to perceive very clearly. If it would imply imperfection in the Deity to suppose He created the world for Himself because, being perfect, He could want nothing, it seems almost absurdity to suppose He created it out of regard to the wants of a creature who had no existence. It is further assumed that the creature was created free, and had the problem of its destiny placed before it. It could exercise that liberty, and progress; or refuse to exercise it, and remain stationary.

In his chapter on the incarnation, the author argues that man's conception of a Deity must be at best only that of a being having in perfection all the best qualities of humanity; that is all that remains.

ply, and that is felt to be insufficient to gratify the religious sentiment. Here arises a most difficult problem, and one that can be solved only by the incarnation. God must be loved in order to be loved. A voice within bids man love and worship God, but the God is relative and human, and of a nature like that of man, and such a God cannot be an object of worship. "It is at this point that Christianity steps forward and presents its great hypothesis of the incarnation, as the only possible mode of escape from the dilemma, and as the solution of the problem." Christianity asserts that God condescended to the exigency of human nature, "by taking of the manhood of man." If the hypothesis of the incarnation be true, God is still accessible to reason, and also all the heart can desire, and to all who accept the dogma there is no longer any antagonism between philosophy and religion. That they are practically in opposition because they invade each other's territory. The author's argument is designed to show that the dogma of the incarnation is essential to man, and therefore must be true, and, assuming that dogma, to follow it to its logical consequences. As for the historical evidence of the incarnation, it is candidly admitted historical facts are very far from verifying it. The evidence must be in our own nature. The miracles cannot convince, for they will not bear examination. Neither prophecy nor prophecy suffices to establish the paradoxical dogma of the incarnation. In order to prove this rather bold assertion, the author uses abundant quotations, showing the inconsistency of Scripture narrative. The Divinity of Christ, he thinks, would fare badly on such scanty and incomplete testimony. "What, then, to every Christian, is the evidence for the incarnation. It is not Scripture, it is not the Church, it is not history, prophecy, or miracle. It is his own nature that bids him to see God face to face, and live." Having thus disposed of the incarnation in a manner that cannot fail to be highly satisfactory to those who believe it already, the author proceeds to show how the incarnation supplies all man's spiritual wants, and how firm a foundation it lays for morals. On this basis is built Catholicism, which is the coordination of all the doctrines, and ancient and modern systems of religion. It is the coördination of all ideas, maintained invariably in the infinite conception of Christ; it is the fusion into one of all religious ideas; it contains all that is good in all systems, but is not content with that. "If Catholicism be the principle of inclusion, Protestantism is the principle of exclusion." The Roman Catholic Church has failed because it has bidden each man to dissolve his personality in God and disappear as an entity. Protestantism, by declar-

ing the infallibility of private judgment, has ended in atheism. The supposed errors of Luther, Melancthon, Calvin, and other reformers, are pointed out at some length. According to Luther, man is so utterly corrupt that there is no need for him to attempt a reformation of himself; thus by the negation of duty the idea of responsibility is destroyed, and in its place we have justification by faith alone. The Calvinistic theory, which abolishes the idea of free-will, is not found more satisfactory. "If Lutheranism and Calvinism have not led," says the author, "wherever they have been embraced, to a general dissolution of morals, this is due to the fragments of positive truth which they have retained, and to the fact that men are often better than their profession, and that none are rigidly consequent in what they do to the principles they claim as their guide." It is because of this schism between religion and duty introduced by Protestantism that the Catholic system is defended. The Protestant spirit carried to its ulterior consequences is said to lead gradually, after a denial of the Church, to a denial of every thing else, and even to the doctrines of the positivists, or those of Rénan. The author believes the effect of the Protestant spirit to be a breaking up of the social relations by setting man against man. The fundamental principle of the system is division, whereas that of Catholicism is unity. The divorce of the aesthetic from religion brought about by the Puritans is lamented. "Not only has Protestantism divided morality from religion, and religion from beauty; it has not suffered truth to stand intact. Religious truth is shivered into a thousand bits, and truth is set against truth."

One chapter is devoted to the consideration of Christianity in its bearings on man's individuality. Liberty is taken for granted to be necessary for the development of individuality, and is defined as the faculty of exercising freely man's inalienable rights. Before the advent of Christ there was no recognition of those rights, the only right known being authority founded on force. But Christ by His death set all men free. By the incarnation man's rights are based on dogma, and their exercise becomes a religious necessity. "The liberty to exercise them had been disallowed throughout the middle ages by the growth in Christendom of a theocracy, and through the union of Church and State. The emancipation of liberty began with the preaching of the Gospel, but, interrupted during the middle ages, was recommenced in the sixteenth century, and has been continued ever since." The development of the principle of individualism the author traces through the following stages:

I. Leonardo da Vinci made the individual judgment the appreciator of scientific facts.

II. Luther made that same judgment the criterion of religious, i. e., of sentimental dogmas.

III. Descartes made private judgment the basis of philosophic certainty.

IV. Rousseau founded morality on the individual conscience.

V. The French Revolution established politics on individual right.

This work is held to be properly the work of the Church, and to flow logically from the incarnation.

The social aspect of the incarnation is made the subject of another chapter, which deals chiefly with the organization of the Church. The incarnation necessitated the Church, which was to carry out the work begun by Christ. The incarnate Word has for its characteristics unity, sanctity, catholicity, apostolicity, and infallibility. Therefore these should be the marks of the Church also. As Christ consummated the union of the finite and infinite, therefore unity is an essential characteristic of the Church. The Church was the first corporate body to set the example of representative government: therefore despotism forced on the Church an alteration of its constitution, to which must be attributed the evils that accrued to religion in the middle ages, and some of which still linger. The history of the constitution of the Church and its vicissitudes from the earliest times until it was overthrown by Napoleon I. in 1802, are discussed at some length. The author believes that had the constitution of the Church not been invaded by the State, there would have been no papacy, no spiritual tyranny, no Reformation. The papacy is deemed a great evil. It is a Christian theocracy, and a theocracy is not deducible from the incarnation. Confusing moral with effective authority, the papacy became a despotism over men's souls and bodies. It is opposed to free-will, to liberty of conscience, and to liberty of science; and the Inquisition is the logical consequence of a system of government in the name of a God of compulsion. Theocracy, then, is an anomaly, a flagrant contradiction of the first principles of Christianity; nor is governmental authority, which makes the religion subserve the State, one whit better. Whenever government touches religion, and endeavors to enforce any point of conscience, it contravenes right.

"The only authority compatible with Christian principles which the Church can exercise is moral authority, through persuasion." If the incarnation is necessary to all men, it is necessary to have teachers, and their teaching in matters of religion should be authoritative. Hu-

manity has always required the priest, and it is only because ecclesiastical authority has been frightfully abused that so many shrink from the idea. It is no more terrible, the author assures us, than scientific authority. Hence in spiritual matters the Church has authority to speak dogmatically, but her authority is limited to the declaration of the whole truth. The author believes œcumenical councils requisite for the well-being of the Church, and concludes his remarks on authority in the following language :

"If any man declares all that is within the range of his own belief, and admits as possible all that is believed by others, he is very near to the realization of Catholicity."

"If any man declares all that is within the range of his own belief, and accepts as true all that is authoritatively declared by the representatives of all mankind, he is a Catholic. He may not himself be able to believe, but he believes the measure of truth to be universal and not individual."

. "This is the function of the Church, to declare authoritatively all truth ; and every man is morally bound to accept all as true, some articles because they are within his own apprehension, some because they are within the capacity of others."

Grace is declared to be the relation of God to man's moral nature, as truth is his relation to man's mental and life to his animal nature. Man may accept or reject any one of these gifts, or all. He may accept life, and reject intelligence and morality ; then he lives only as an animal. He may accept life and reason, and refuse grace ; then he is merely an intelligent man. He may accept life and grace, and refuse reason ; then he lives as a mystic. He may accept life, reason, and grace ; and then he lives his perfect life as a Christian. The Church in its sacraments and ordinances supplies the means of grace, which are likened to the lower rungs of a ladder reaching to heaven. A host of these means of grace were rudely abolished by the Reformers, to the great detriment, in the opinion of the author, of the ignorant and feeble.

Prayer is said to be the assertion of our own free-will. If we were ruled in all we did, prayer would be out of the question. Consequently, prayer is illogical to a Pantheist, a Mohammedan, and a Calvinist. At this point the author again bewails the prevalence of Protestantism, which he designates a religion of the past, and again he returns to his favorite dogma of the incarnation to prove the necessity of prayer. The Protestant will pray, he says, because he wants something ; but he

will not worship, for want of the objective presence which the Catholic enjoys in the Eucharist.

The incarnation is once more brought forward, in allusion to the atonement, as the crowning act of that love which alone explains creation. The dogma of justification is also closely allied to that of atonement, and is defined by the Church as the exaltation of man from a state of sinfulness to one of grace. "As all the faculties of man are positively good, and only negatively evil by their being disordered and opposed, justification is the restoration of these faculties to their proper order. This can only be effected by man recognizing and loving God."

Having disposed of Christian faith and Christian love, the author comes to Christian hope, and here again demonstrates the adaptability of the incarnation to all possible exigencies. The resurrection supplies the proof that one who has died may rise again, and gives to all their guarantee of resurrection. It is argued also that our aspirations, and hopes, and longings, point plainly to some future life where our dreams may be realized and our expectations fulfilled. Hence the author concludes that death will not terminate our existence, that our condition after death will be one of eternal happiness, and that the happiness will be exactly commensurate with the desires of man and his capacity for enjoyment. But, "if the desire to delight in God has been extinguished in life, through man's own will, there is no reason to believe that it will be restored; for such restoration would be an infringement of the determination of man's free-will." As regards the resurrection of the body, the author believes that, if it be a positive idea and an earnest wish, it will be fulfilled.

The concluding chapter of this volume is devoted to the theory of development. The author believes it to be in harmony with God's dealings with man to give him facts and leave them to develop by a gradual process. Hence he believes the incarnation to be an inexhaustible source of truths for all future generations, and he believes Catholic theology, *minus* papal infallibility, to be a logical deduction and outgrowth from the dogma of incarnation. No one member of the Church can be infallible, but the voice of the whole body in general council is the voice of Christ. "Another reformation is needed," says the author, "to pluck up individualism by the hair from the depths to which it has sunk. To effect this, Catholicism is alone capable; but it must first rid itself of the spiritual autocracy of the Roman pontiff. Rome has its lesson to learn, and so has England. Too long has the State exercised control over religion; for if there be a

God, to control religion is to control God in His action on the consciences of men, and it is therefore a sacrilege." Again, "when the Roman Church has succeeded in shaking off the nightmare of the papacy, and the Anglican Church has accepted the full complement of Catholic truth, or has at least taught its members not to carp at truths they cannot see, we may hope that, with the reunion of Christendom, faith in the God-man will once more become a mighty plastic power, moulding society with perfect relations, and projecting individuality into vivid creativeness." This is evidently the utopian expectation of the author, who looks forward to a time when all sects and all religions shall be blended into one, and that one the Catholic Church, which happens to suit his tastes. He believes that some great religious crisis is at hand, and that the only salvation for the nations lies in their acceptance of the dogmas of the Catholic Church, *minus* papal infallibility.

We have followed Mr. Gould with much interest through his ingenious and elaborate arguments, but it is not without some regret that we find so able and courageous a writer, after discarding the scriptural and traditional foundations for antiquated dogmas, seeking with so much zeal for other grounds on which to rest them. The most enlightened minds in all civilized nations are laboring to clear away the theological rubbish that has for so many centuries encumbered the progress of mankind, and we cannot think that the author is doing humanity any service by his endeavors, honest though they may be, to perpetuate phases of faith bettersuited to the middle ages than to the nineteenth century.

Body and Mind,¹ the name of the little volume by Dr. Maudsley, is the product of a logical, analytical, classical, and scholarly mind, and in its beauty of diction may well be compared with the efforts of the best English writers. The object of the author is to inculcate the necessity of studying body and mind, not apart, but in their reciprocal relation, as mutually dependent upon each other in health and disease. In order to pursue the subject in a highly-scientific manner, he discards entirely the subjective method, which considers mind as a mere metaphysical entity, and adopts the only true road to success, the physiological or inductive method, which begins with the interpretation of the simplest nervous functions, and by a process of synthesis rises to

¹ *Body and Mind: An Inquiry into their Connection and Mutual Influence, specially in Reference to Mental Disorders. Being the Gulstonian Lectures for 1870, delivered before the Royal College of Physicians. With Appendix.* By Henry Maudsley, M. D., London, etc. New York: D. Appleton & Co., 1871, 12mo, pp. 155.

the more complex. By this means one gradually arrives at a proper understanding of the most complex manifestations of mind, so far as our present knowledge will permit, through a careful study of the laws of evolution of the lower nerve-centres. Besides the consideration of the physical condition of the mental functions in health, the author discusses the problem of hereditary predisposition which plays such a large part in all the diseases of the nervous system, and, by comparing certain forms of degeneracy of mind in man with healthy mental functions, he is enabled to show their relations to other nervous disorders. Again, the subject of the relations of the morbid bodily states to disordered mental functions receives its due share of attention. The theory of vitality, its dependence on physical and chemical processes, and the hypothesis of the highest form of matter being derived indirectly from the inorganic world, is very plausible, and very much more consistent than that which we have so long accepted. In a small work like the present it is quite out of the question for Dr. Maudsley to discuss or take up in detail the many important ideas which he has so ably suggested, and which bear so directly upon the unity of body and mind, but suffice it to say that they will afford ample means of reflection to all those interested in diseases of the nervous system. There is no subject mentioned in this volume which needs more careful study and research than that of the mental effects of perverted sensations, which even at present is hardly in its infancy. The interpretation of these, as Dr. Maudsley suggests, is undoubtedly best effected during sleep, when the external senses are in abeyance. In the criticism "On the Limits of Philosophical Inquiry," by the Archbishop of York, if his premises be so false and his assertions so reckless, it seems as though Dr. Maudsley had given too much time and attention to that which would have been much better left entirely unnoticed. Few men who have been trained in the school of theology can be found, even at this enlightened period, who will accept *in extenso* the system of positive scientific research, yet does it shake the truths of the student of science, because the man of God will persist in making use of false premises and arguing according to his metaphysical belief! On the contrary, let him continue in his course, and, while he makes no real advance except in the prolific use of words, science will gain renewed strength from a source from which it least expected succor. As religion is a subject of faith and belief, so is science a matter of facts alone, and to apply a speculative method of reasoning to the latter, and an inductive method of reasoning to the former, is simply absurd.

IF the extensive sale of a book be any criterion of its excellence, then Billroth's *Surgical Pathology*,¹ which has just been very ably and literally translated into English, from the fourth German edition, by Dr. Hackley, must indeed enjoy a high reputation among the medical profession, not only of Germany, France, Russia, Italy, and Hungary, into the respective languages of which countries it has been translated, but also of America. Owing to the rapid strides which have been made in pathology of late years, and which is mainly due to the efforts of the German school, on account of their persistent endeavors to develop microscopical pathology as much as possible, we have within a very short period been much better prepared to appreciate the importance of this branch of medicine, which, although unfortunately not considered of much consequence by many medical men, is nevertheless destined to become the true and only means of solving many intricate problems. For years physiology has led the way, while pathology has stood as it were in the background; but, thanks to the labors of Virchow, Paget, Kölliker, Rokitsansky, and a host of other distinguished authors, pathology is fast taking its proper place, and in some respects is far in advance of physiology. Within what a short period have the views of cellular pathology, as annunciated by Virchow, been accepted, but now they are engrafted in the medical mind, and have become facts of the past! Yet what has been so nobly begun is by no means finished, and it is with pleasure that we add the name of another author to the catalogue, whose views are not entirely in accordance with those which we have been accustomed to study, but rather an advance upon them. We regard Billroth's *Surgical Pathology* as a first-class book by a first-class man, and although we cannot accept the many hypotheses until they have become matters of fact, nevertheless they will undoubtedly afford much interest to the microscopist, and through him become of utility to the profession. The theory of the wandering cells, which are analogous to the white-blood corpuscles, escaping from the vessels, and becoming the essential element in the formation of tumors, is a new idea, and rather opposed to former views; yet their escape is no more inconsistent than that tissue-cells should permeate the walls of veins, which has been demonstrated

¹ *General Surgical Pathology and Therapeutics, in Fifty Lectures. A Text-Book for Students and Physicians.* By Dr. Theodor Billroth, Professor of Surgery in Vienna. Translated from the fourth German edition, with the Special Permission of the Author, by Charles E. Hackley, A. M., M. D., Surgeon to the New York Eye and Ear Infirmary, Physician to the New York Hospital, Fellow of the New York Academy of Medicine, etc. New York: D. Appleton & Co., 1877. One vol., 8vo, pp. 676, and 152 Woodcuts.

is a doubt. The embolistic origin of metastatic abscess, as proven by investigations of Otto Weber, is another point settled which had been in dispute. The chapter on tumors is excellent, and well worthy of careful perusal. The ideas of the author on ergotism differ from his own, first, because they have never been proved; and secondly, for the reason that in this country patients have taken very large doses of *secale cornutum* for months without manifesting the least unfavorable symptoms. Other causes have been given which undoubtedly bear much more important bearing upon this disease. As a whole, the work is to be commended as far in advance of any similar treatise in English language.

In the preface to the second edition of his work on the Uterus,¹ Byford announces that it has been his object "to add to its usefulness by thoroughly revising and correcting, enlarging and illustrating." The volume is somewhat enlarged, and it has evidently undergone one revision, but we cannot say much for the illustrations, and the style and grammar of the work are entirely innocent of correction. The authors, who have not much to say, succeed in making very few good books; but it is the misfortune of Prof. Byford that, having little much to say, he is utterly unable to put his ideas into the simplest English. He appears to have even a peculiar talent for putting up the most awkward and bewildering sentences of which the English language will admit. Nor is this an occasional or accidental defect. Every page of his writings would furnish examples of the worst of the Queen's English, such as the following: "I think it has been observed that when patients suffer greatly from pain in the uterus they complain less of suffering which is more directly referable to the uterus, than when any other symptom seems to exceed the pain." Speaking of uterine treatment during pregnancy, he says: "I am not satisfied that the attempt is always best to be made, and I would rather wait until pregnancy is over, and even stop the treatment if it has begun." Again: "The form of disease in persons who have never married, but never been pregnant, partake to some extent of the character of both the virgin and the childbearing woman. They are characterized by external, combined with internal, mucous inflammation, but not by a fibro-cellular." Now, what I mean by these statements is, that

Treatise on the Chronic Inflammation and Displacement of the Unimpregnated Uterus. By Wm. H. Byford, A. M., M. D., Professor of Obstetrics and the Diseases of Women and Children in the Chicago Medical College; Author of *Practice of Medicine and Surgery applied to the Diseases and Accidents of Women*, etc., etc. Second edition, enlarged. With numerous illustrations. Philadelphia: Lindsay & Blakiston, 1871.

these kinds of patients are likely to have the forms of disease which I have ascribed to them, but there certainly are exceptions to all them." Once more, alluding to atrophy, he says: "Permanent increase of size or hardness of the cervix must be the results of subacute inflammation, and generally coexist with it." These specimens are taken at random, and give a fair idea of the general style of a writer whose name on the title-page is adorned by the letters A. M. D., and who is a professor in the Chicago Medical College.

As an obstetrician and a gynecologist, Prof. Byford has a high reputation in the West, and we believe he deserves it; and the favorable reception which has been given to his works by the profession is an evidence that they contain much that is valuable. The volume before us is too small and incomplete for a manual on the subject which it treats, but it is the result of large experience and faithful observation. We are somewhat surprised to find the author allude favorably to the abomination known as the stem-pessary, and, recommending, rather freely, the use of caustic potassa and the stick of nitrate of silver. These powerful agents may answer well in his hands, but they are exceedingly liable to abuse by others inexperienced. We should think, too, that pyralism, of which he speaks, proves in some cases of induration of the cervix, might easily do more harm than good. On the whole, we consider the book a useful one for those who have already had some experience to enable them to discriminate in adopting the author's suggestions. It is painful reading, but those who have the courage to struggle through it will find something to reward them for their labor.

To the student of science, in his search into the mysteries of innumerable worlds which surround us, the concise, intelligible, highly-scientific little volume entitled "Other Worlds than Ours" will no doubt be found of interest and, we trust, will not only reveal to him many new theories, but will aid him in acquiring the many important facts which have been so recently discovered. In the onward march of science on nearly all sides, astronomy has not been left behind, but remains in the embryonic condition which characterized it during the days of Newton and Galileo. Since the real commencement of the study of solar physics, a little over two hundred years ago, the

¹ Other Worlds than Ours: The Plurality of Worlds Studied under the Light of Recent Scientific Researches. By Richard A. Proctor, B. A., F. R. S. Author of "Saturn and its System," "Sun-Views of the Earth," "Half-Earth with the Telescope," etc. 12mo, pp. 334. New York: D. Appleton & Co., 1891.

minds of the world have endeavored with indefatigable zeal to explore this almost unfathomable field. Yet much was so hypothetical that it seemed almost impossible to make much progress until some new means of research could be discovered, and this it was the fortune of the inventive genius of the nineteenth century to bring to light in the discovery of the application of the spectroscope to solar physics. A great revolution has within a very few years consequently taken place, and much of what was formerly only conjecture has now become matter of fact. To the skeptic it will no doubt seem hypothetical to state that many of the elements of the atmospheres of other worlds than ours are now capable of being revealed to us with certainty, but time and perseverance have already accomplished this much. How far many of the revelations thus made are able to be extended by the means of terrestrial analogy, and to be accepted as facts, it is left for the reader to judge for himself. One thing is certain, however; that, while much was in darkness, much has been brought to light, beyond even the fond expectations of the most sanguine observers. It is always a pleasure to read a book which contains so much good sense and so many plausible theories as we find in "Other Worlds than Ours."

CHRONICLE.

I.

PHYSIOLOGY AND PATHOLOGY OF THE BRAIN AND NERVOUS SYSTEM.

PREPARED BY DR. D. F. LINCOLN, AND S. G. WEBBER, OF BOSTON.

1.—*Spontaneous Combustion*. By ALEXANDER OGSTON, M. D., Aberdeen. (British and Foreign Medico-Chirurgical Review, January, 1870).

In many of the older writers, whose remarks were penned in the infancy of several of the sciences to which we now owe the great clearness and definiteness of our views of diseases and morbid states in general, there occur passages and details of cases leading to the question as to whether or not it is possible for the human body spontaneously to inflame, or, being once inflamed, spontaneously to continue to burn until the tissues are reduced to ashes.

During the latter half of the eighteenth century a general interest, not confined to the medical profession, was brought to bear upon the subject; and in the earlier years of the nineteenth century we find medical jurists and medical men of the greatest eminence engaged in working out the problem, and contributing to a better understanding of it. At this time, the belief in the possibility of such an occurrence

was universal, with the exception of an unexpressed skepticism in the minds of the profession in England, with whom the notion of such a possibility has been at no time general or popular.

Dupuytren was inclined to believe that there existed merely an increased combustibility of the tissues in certain cases, and not, as had been assumed, a capacity for occasional spontaneous ignition. The new school of legal medicine, originated in Germany by Caspar, refused any belief to either of these views, and his opinions were confirmed by Liebig, who in 1850 published a pamphlet on the subject, setting forth, as had previously been mentioned by Fontanelle, that portions of flesh soaked in alcohol will burn only so long as the alcohol burns in them, and asserting that the combustion of such a structure as the human body, containing seventy-five per cent. of water, is an absolute impossibility without the aid of a large amount of neighboring combustible material. The works of the last-mentioned writers have given to the subject all the features it now presents, and have stamped, upon the minds of those who have, in recent years, adverted to the question, the tendency to incredulity observable in the treatises on legal medicine of Stillé, Guy, and Taylor. One fact, however, is rather remarkable, that none of those who totally disbelieve in the idea of spontaneous combustion profess to have seen a single case analogous to those observed by its supporters.

There cannot be the least doubt that *the weight of authority is in favor of spontaneous ignition*, or, at least, of increased combustibility, two modes of viewing the subject, which have been generally combined under the title of spontaneous combustion, or empresmus. Of thirty-five writers to whom the author has had access, five are entirely skeptical, viz., Drs. Caldwell, Caspar, and Taylor, and the chemists Bischoff and Liebig; three believe in increased combustibility, viz., Dupuytren, Stillé, and Guy; while the remaining twenty-seven believe in the spontaneous ignitability of the human body.

The most prevalent theory has been that held by the early writers and supported by Orfila, Fodéré, Gordon Smith, Paris, Briand, etc., etc., that, under certain circumstances, the body is capable of generating under the skin, and in the connective tissue and cavities of the body, hydrogen, or other gases similar to those formed in the intestines, and that the electrical condition of the body can sometimes ignite these gases. What these gases are has not been clearly stated, Gordon Smith being of the opinion that carburetted hydrogen is the chief compound; and others, such as Averardi and Apjohn, believing it to be phosphuretted hydrogen.

Another theory, advocated by Lair, Ritter, Kühn, and Mitchell, and based on the fact that most of the victims of this occurrence have been drunkards, is, that alcohol is present in their blood to such an extent as to be combustible. Now, Liebig and Bischoff say that alcohol cannot be present in the blood and tissues without coagulating their albumen. But this is not true: the author himself has seen cases of death from alcoholic poisoning, or in people under the influence of alcohol, where the smell was strong in the blood, and sometimes so marked in the ventricles of the brain that it was possible to ascer-

tain the nature of the beverage used. Chemistry, too, has frequently detected alcohol in the blood, and, in a case observed by the author's father, there existed so much alcohol in the body that the serum in the ventricles of the brain caught fire and burned on the approach of a lighted match. Marc and Scherf declare that the eructations and breath of drunkards are occasionally capable of taking fire, though this point seems rather doubtful. But even admitting the presence of large quantities of alcohol in the body does not make this theory tenable, as the experiments of Fontanelle, Liebig, and Bischoff, on flesh soaked in alcohol, sufficiently demonstrate.

Fifty-seven cases are recorded, some of them dating back two centuries. They may be divided into two classes: in the first of which may be placed those manifestly false, or where the statements bear absurdity on their face, as well as those the truth of which may justly be suspected until fresh and better evidence shall have been collected to prove or disprove them. In the second class may be placed those whose accuracy cannot be denied; and it will be seen from this division that the conclusions based on the authentic cases are very different from those which can be deduced where all the cases, true and doubtful, are admitted indiscriminately as evidence.

The cases of the first class, which the author cites, certainly justify him in calling them "worthless data," although they furnish very entertaining reading. An hysterical girl feels a sudden burning in her fingers, and sees a blue flame hovering about them, "visible only in the dark," which cannot be extinguished by water. A blacksmith has a similar experience. A man sees a flash of fire seize on his shirt, which is instantly reduced to ashes, without his wristbands being touched at all; he cries out, and when help arrives he is found on the floor, surrounded by a light flame (of spirit, spilt over his clothes?) which disappears as his friends approach. A man lies down in bed with his clothes on, and burns spontaneously; his "whole trunk" and thighs are said to be badly burnt—yet, "remarkable to state, at the places where his clothes were completely burnt the body was uninjured, and *vice versa*." Most of these cases rest upon the authority of the person injured. It is upon this class alone that the doctrine of *spontaneous ignitability* rests; those to follow, whose veracity cannot be impeached, speak merely for *increased combustibility*.

The second class of cases, too truthful in their narratives to be disbelieved, and attested by so many competent observers, present a character differing much from the fables cited above. In the first class, many of the patients recovered; in the second class, the subjects all died; and not only so, but were all *found dead*—their bodies, their clothes, and the articles in their neighborhood, being partially or entirely destroyed by fire, the only remarkable thing about them being that the bodies were burnt and charred out of all proportion to the destruction of the neighboring objects, and to an extent which seems incapable of being accounted for by the heat of the burning clothes and objects in the vicinity. (For illustration, several specimens of cases are cited, from which only one is here presented, as follows:)

"On the 14th March, 1869, my father and I were requested to ex-

amine the remains of Mrs. Warrack, or Ross, aged sixty-six, who resided alone in a house near the Bridge of Dec, Aberdeen. She was said to have been stout, of intemperate habits, and her son stated that he had left her, at 10 A. M. on the 14th, in her usual health. She was found at 11 A. M. on the same day, lying burnt on the lower steps of the stair of her house, on her left side. The house was pervaded with a disagreeable smell, but liker that of burning straw than of burning animal matter. The room which she usually inhabited, the door of which was within two yards of the place where she lay, had the same smell; the chair in which she sat stood in the middle of the room, its back almost entirely consumed, and its arms wholly so. The seat of the chair showed mere traces of the action of fire. The bed, about two feet from her chair, had its straw mattress slightly burnt at its fore part. The wood-work of the bed and the curtains were uninjured. Her chair was about four feet from the fireplace, and about two feet from an uninjured mahogany table, on which stood an empty beer-bottle, smelling of whiskey. Nothing else in the room was touched by fire. The stairs were of wood, and underneath, and in the immediate vicinity of where she lay, they were charred to the depth of a quarter of an inch. The perpendicular bars of the hand-rails similarly charred beside her for a foot up, the top rail and the wall, which was half a foot from the hand-rail, blackened by smoke. The condition of the body, however, showed that the fire had caused the greatest alterations in it. The hair was burnt off, the soft parts of the face and front of the head burnt off, the bones exposed, blackened, and calcined. The back of the head, the neck, and the trunk everywhere, converted into greasy charcoal to the depth of about an inch, the skin totally removed, and the bones of the trunk lying bare, blackened, and calcined. The front wall of the abdomen totally destroyed and wanting; the intestines burnt into a hard and blackened mass; the liver converted into ashes for the depth of an inch, but retaining its shape, its left lobe projecting nine inches from the margins of the ribs. The upper limb distorted; the elbows strongly flexed, and everywhere charred to great depth, the bones, however, even of the fingers, preserving their position. The right thigh had its deeper muscles still uncharred, but of the appearance of roasted beef, and very dry; the skin and superficial muscles totally burnt away. The right leg only partially attached to the thigh, and entirely converted into a soft, black, greasy, and shapeless cinder, through which the finger could be pushed with ease. The left thigh and leg in a condition similar to that of the right extremity, but still attached to the foot, which was a charred and shrivelled mass similar to the right foot. Not a vestige of clothing remained anywhere."

2.—*Recherches expérimentales sur la Régénération anatomique et fonctionnelle de la Moelle épinière.* MASIUS et VANLAIR, Professeurs à l'Université de Liège. (Mémoires Couronnés, etc., publiés par l'Académie Royale des Sciences, des Lettres et des Beaux-arts de Belgique, t. xxi., Mars, 1870.)

Experimental Researches in regard to the Anatomical and Func-

neration of the Spinal Cord. MASIUS and VANLAIR, Pro-
be University of Liège.

*ly of Certain Anatomical and Physiological Conditions of
Cord.*—After studying the filum terminale, we arrived at un-
conclusions in regard to its structure. *a.* The filum terminale,
at its upper and middle portion has the same elements as
elf; but they are arranged in a slightly different way. At
ry there are nervous fibres, mostly longitudinal, represent-
mns; and in the centre multipolar cells, representing the
nce; but the latter are thinly scattered and occupy a nearly
ce; so that here there are neither anterior nor posterior
consequently no columns. The medullary canal is likewise
e filum terminale, but its very eccentric situation, its lining
epithelium, and the anastomotic communications between
rich form its wall, and the multipolar cells of the central
t also a peculiar character.

oportion as the posterior end of the filum terminale is ap-
t is successively deprived of its layer of nervous fibres,
ganglionic cells, and finally is reduced to a hollow epithelial
presenting the central canal.

lum terminale of the frog, as just described, is compared
me part in man, remarkable differences are found between
ctures. But, on referring to the *embryonic* development of
man, it is not a little surprising to see these differences
iminish, and the examination of facts leads to the conclu-
e filum terminale of the adult frog resembles the human
ed in its development. Moreover, each segment of the
nale in the adult frog represents successive phases of the
t of the human cord.

ling now to the study of the physiological properties of
s of the cord. To estimate correctly the effects of section
on sensibility and motion, it was important first to circum-
utaneous territory of the principal roots, and especially of
e roots. For this purpose, the root under examination was
d the points of the integument which had lost their sensi-
t, paper disks moistened with very dilute sulphuric acid being
duce the cutaneous irritation.

means it was found that the regions of the hind-legs sup-
e seventh pair and the tenth pair were clearly enough cir-
; but the limits of the regions supplied by the eighth and
be determined only rather vaguely. The anterior legs are
ith sensitive fibres, almost exclusively by the second pair.
its of the reflex centres in the cord which unite to the cor-
motor fibres, the fibres which compose the four pos-
s of the sciatic plexus (seventh, eighth, ninth, and tenth)
d in a segment of cord which extends from a little less than
tres in front of the insertion of the seventh root to just be-
section of the tenth.

venth and eighth roots have each a separate centre. The
ninth roots also, doubtless, have separate centres, but they

cannot be demonstrated. Each of the centres, whose limits have been accurately defined, is included in a segment of the cord which commences immediately behind the insertion of its roots, and extends toward the cephalic end to just behind the insertion of the next roots.

The portion of the cord behind the tenth pair seems not to be the centre of reflex action.

What is, then, the function of this part of the cord?

The ganglionic cells contained in the filum terminale send prolongations which are directed forward, and which, after having coursed the interval which separates these cells from the insertion of the tenth pair, are united to the fibres coming from the anterior part of the cord to form the last spinal pair, and emerge from the cord with them. The cells of the filum terminale supply thus at once to the sensitive and motor roots of the tenth pair—and on both sides—fibres respectively sensitive and motor. The sensitive cells send besides sensitive fibres to the brain, and the motor cells receive likewise motor fibres from the centres of volition. But the motor cells remain independent of the sensitive cells. There are no anastomoses, or, at least, functional communication between the two species of cells.

The reflex centres of the anterior legs commence between one and one-half mm. in front of the insertion of the second root, and end immediately below the third root. Their extent is three to three and a half mm.

II. *Study of the Reproduction of the Cord from a Histological and Functional Point of View.*

OBSERVATION I.—A rather small, lively gray frog was subjected on March 25, 1869, to an operation by which two millimetres of the cord between the third and fourth vertebræ were removed. Immediately there was complete loss of sensibility and voluntary motion, with preservation of reflex excitability in the hind-legs. After a month, when it was placed on a table with its hind-legs stretched out, it soon drew them up under itself, and took the position usual to frogs at rest. If suspended in the air by its fore-leg, it performed spontaneously slow movements of extension and flexion with its hind-legs. When placed on its back, it endeavored to turn over, using both fore and hind legs. The skin of the hind-legs was still anæsthetic. On irritating their skin, no motion showing pain was produced; when the fore-legs were irritated they were withdrawn, and the hind-legs were simultaneously moved.

Reflex movements, excited by pinching, were not produced at the level of the articulation of the sacral with the coccygeal vertebræ. More posteriorly they were obtained, and when the irritation was applied to the leg they were very energetic.

After nearly a month the frog was examined. The skin was not healed, the vertebral arches were not reproduced. The ends of the cord were clearly distinguishable by their white color. Between them was an interval, wider posteriorly than anteriorly, filled with a yellowish, translucent substance of a gelatinous appearance. This gelatinous substance filled not only the irregular cuneiform space between the two ends of the cord, but still was prolonged a little for

ward and backward between the walls of the canal and the lateral
ices of the two ends, so as to cause adhesions between these and the
alla. The gelatinous substance was a little more consistent in the
ris of the canal than at the periphery. The chief elements were
ella, of which some seemed perfectly spherical and ovoid, without pro-
ngations; others had one prolongation; others fusiform without being
ry long, and bipolar; others were multipolar, and of these, some pro-
ngations could be followed from one cell to another. These cells
re evidently nervous cells, identical with those in the gray substance
the cord. There were also nervous cells which seemed to have en-
ed upon the process of degeneration. Also in a very thin granular
terial which formed the fundamental substance of the gelatinous
re were found also flattened, irregular fibres, thicker than those
ich proceeded from the cells, with nuclei. These were analogous to
fibres of Remak. There were no medullary fibres, but some fine
varicose.

Both ends of the divided cord contained degenerated nerve-fibres.

OBSERVATION IV.—One millimetre was removed at the union of the
and sixth vertebræ from a frog's cord in November, 1867. In
7, 1868, voluntary and reflex movements were completely restored
be hind-legs, and cutaneous sensibility had reappeared as acute as
normal conditions.

OBSERVATIONS V. AND VI.—Similar voluntary motion and sensa-
were perfectly restored.

The conclusion from these experiments is : *The spinal cord in frogs
resumes the power of spontaneously repairing a loss of substance caused
its structure, and of recovering its previous anatomical and physiolo-
gical properties.*

This is, we think, a new discovery.

Others have investigated the return of muscular irritability after
ion of the cord, but not after resection, and the anatomical condi-
of the cord was not examined. When resection has been made,
animal always died.

The reason for success in the experiments is found in the fact that
operations were performed in the winter, when the frog was less
sitive to the injury; small, active *gray* frogs were used. The ner-
fibres seem to appear after the cells in the interposed substance,
sh corresponds with the embryonic development of the cord when
cells of the gray substance are first found, then the fibres. Vol-
untary motion reappears before sensibility. This is not due to any
rence in the length of the segment in the anterior and posterior
of the cord. The explanation is found in the theory of nutritive
fres.

The sensitive fibres have their trophic centre in the spinal ganglia,
de the cord is the common trophic centre of the anterior roots, but
not be decomposed into secondary centres. Probably the same is
for these two species of intramedullary fibres, which may be con-
sidered as prolongations of the roots. Now, in the frogs operated on,
intramedullary sensitive fibres which pass from the central end of
cord to the brain will be cut off from all communication with

their nutritive centre, while the intramedullary motor fibres will escape this misfortune.

The following aphorisms follow from the preceding:

"1. The *spinal cord*, in frogs, may spontaneously repair losses of substance in its own tissue by means of a new *medullary tissue*.

"2. The return of the *functions* of the cord suspended by reason of the lesion coincides with the regeneration of its anatomical elements.

"3. This regeneration, at once anatomical and functional, takes place only gradually. For the reproduction of the histological elements, the formation of *cells* precedes that of fibres. As to physiological properties, voluntary motion reappears first."

3.—*The Muscular Sense (Muskelsinn)*. By Prof. GEORGE. (*Archiv für Anat. Physiol. und Wissenschaftliche Medicin.*, ii, 1870 p. 251.)

The separation of the sense of touch (Tastsinn) from the sense of feeling (Gefühlssinn) was a great step toward the understanding of the latter. But serious errors and uncertainty still prevail concerning the signification of the new sense.

The distinction between the sense of feeling and the sense of touch became necessary so soon as it was known that the latter depended upon motion. All the other senses, notwithstanding their material differences, are merely modifications of feeling (*Empfindung*), and agree in this, that they receive their impulse from without, and convey it to the brain. The muscular sense can be active only when the motor nerves receive their impulse from the centre, and thereby produce contraction in the muscular fibres. This consideration necessarily separates the muscular sense still wider from the other species of sensation, and does not include it merely as a new species with the others, but refers to it an entirely different signification psychologically which corresponds better with the contrast between sensation and motion. As the senses are named from the different organs of sensation, an error might arise from speaking of a muscular sense, when the muscles serve only for motion, and never as an organ of sensation. The reason for this error is found in this, that we have been accustomed to consider that our knowledge of the external world is gained only through the medium of the senses, and that, consequently, the muscular sense must be of the nature of a (special) sense; for it cannot be denied that a large part of our knowledge of the external world is derived through it. As motor nerves are not sensitive, it was necessary to refer this sense to the sensitive nerves found in the muscles, which are acted upon by the contraction of the muscles, and so the distinction between the sense of feeling and muscular sense again appears.

If our mind is in communication with the external world, means of motion as by means of feeling, then it is possible that it may, by means of the former, receive just as correct a knowledge thereof, though in a different manner. This difference in the knowledge is most distinctly marked, and its explanation is found in the contrast between feeling and sense of motion, through the differ-

of the conductive in the sensitive and motor nerves. It is remarkable, that every sensation is subjective, only the touching (*stehende Bewegung*) gains a true knowledge of objects, and which enters into it is of objective significance. We perceive the changes in our sensitive nerves, and we call that, perceptive mind (*empfindende Seele*), so it feels only its own conditions, and we should thereby never receive a notion of an external world: only by touch do we distinguish things from each other; their distance, size, and form, only by motions, by which we do not doubt that they are truly as they entered to us by touch; and after, in this way, obtaining the notions (*Objectivität*), we refer, by a process of reasoning, to the object, the sensations which are likewise received from it, as to it as its attributes; but ever with the proviso that there be something in the object corresponding to them, and differences in the sensations are proportional to the differences in the attributes, without, however, our being able in this way to obtain knowledge of the true object through them.

The external world is known to us by the fact that we distinguish from it; which is possible through our own movements, and an change our position at will. Objects are obstructions, known to us only through the power which we, by virtue of the nerves, can spontaneously impart to the muscles, can increase or diminish. The external world divides up into single objects first by sensation produced by ourselves; the touching hand describes the form of the figure of the object, follows the boundaries, and retains the idea of the object. We measure the size of an object by the resistance which the stretched muscle extends, and the amount of power imparted to it by ourselves, in order to overcome its inertia. The sensation unites the object with the operation through the operation which it calls forth in the sensible world to which it necessarily subjects it; motion separates it from the object as an object opposed thereto.

Sensations come from the outside through the sensitive nerves, (*Seele*) holds itself receptive, and can in no respect change the motions which it receives, the motion for touching (*Tastbewegung*), however, goes out independently from the mind, and may be diminished. We must first from within produce in the muscles a motion in order to experience the resistance of the object; we must diminish the power of the motion, in order to estimate the resistance of the object; we must pass the touching motions along the surface of the object, to learn its form; and, according as we apply the separation of the object and divide it into its parts, there are the single objects.

Sensation proceeds from the object, and is passively received by the mind which has no power over it, but merely receives it; this consists of two factors, the irritation of the object, and the sensory nerve, which the mind can never distinguish. On the other hand, the motion proceeds from the centre, and is, as such, voluntary, independent on the ego; but so soon as it meets with resist-

ance, the separation is complete, and the mind distinguishes what does itself from that which the objects do not allow it to do, and thereby learns their objective nature.

The impressions made on various parts of the sensitive nerves are all conveyed to the brain; from these alone the mind cannot recognize the seat of the irritation giving rise to the impression. Only in motion are found the factors of space and time, and only in the variation of the particular motion and the resistance of the external work by which the motion is limited, lies the possibility of distinguishing the position and localizing the object.

The touch (Tasten) is no impression of the senses (Linnesaffection), and is neither identical with the feeling (Gefühlinn), nor especially closely united to it, yet it can find a proper place by the side of the other senses as muscular sense (Muskelsinn); for this indeed feels nothing, but only serves to localize that which is felt, and to refer it to the objective. Hence, if we say we feel the resistance, we feel the hardness or softness, the weight or lightness of a body, this is the consequence of the old confusion between feeling and touching. We must really estimate the weight of a body by means of the muscular power offset by its pressure. At the same time we touch (Berühren) the body, and so experience an irritation of the sensitive nerves of the skin, which we designate by the expression feeling; but this has as little to do with the muscular power as the sensation of difference of temperature, which is recognized at the same time. But as both occur together, and because the feeling from mere touch is so uncertain, it is difficult for us to separate them. If, however, the sensitive nerves are paralyzed, the difference is clearly seen.

As the so-called muscular sense has nothing in common with the other senses, but derives its entire significance from the motion, the name confuses the relation as it is derived from analogy, as it teaches us a peculiar quality of objects. Still less has it the significance that the muscle is an organ of sensation to which sensitive nerves are distributed; when a limb is moved passively by another, we experience a sensation through the sensitive nerves, for the parts change their relative positions, and we conclude the limb is moved, for it is the same sensation which we feel when we move the limb ourselves. But none of the sensitive nerves found in the muscles can inform us that we have excited a motor nerve so as to produce motion, or how much power has been expended, or how much it must be increased to overcome a resistance; and it is just this to which we come, if we will comprehend the significance of the falsely so-called muscular sense for the knowledge of outside things.

This, it will be seen, touches upon the great question of consciousness.

4.—*Annual Report of the National Insane Asylum in Wien, for the Year 1869.* Dr. MARESCH. *Medizinische Jahrbücher*, Wien, 5 26, 1870.

There remained from the previous year, 1868, 331 m., 833 f., total 664; were treated, during the year, 589 m., 502 f., total 1,091;

35 m., 65 f., total 170, were cured; 42 m., 54 f., total 96, were ; 119 m., 58 f., total 177, died; remained at the close of the ; 1 m., 254 f., total 505. The largest number of patients received in any month was during July, the smallest number in February. According to age there were received, between 10 and 20 4 m., 15 f., total 29; 21 to 30 years, 62 m., 34 f., total 96; 30 years, 85 m., 50 f., total 135; 41 to 50 years, 57 m., 39 f.; 51 to 60 years, 29 m., 19 f., total 48; 61 to 70 years, 4 m., 10 f.; 71 to 80 years, 6 m., 4 f., total 10; 81 to 90 years, 1 f.

various affections giving rise to insanity are thus classified, the males, chronic cerebral disease, 84; excess in drink, 73; cerebral disease, 24; depressing mental causes, 14; unnatural moderate gratification of sexual impulse, 10; excess in venery 10; marasmus, 8; dyscrasia, 6; hereditary taint, 5; traumas, 5; exalting mental affections, 3; uncertain, 3; anaemia, 8. Among the females, uncertain, 43; chronic cerebral disease, 27; acute cerebral disease, 25; depressing mental causes, 18; mental disturbance, 12; anaemia, 11; neuroses, 9; menstrual disease, 8; marasmus, 8; onanism, 4; excess in drink, 3.

Of the more important and interesting cases are reported less fully. Among these is a case of chorea with mental disease in a man fifty-six years old, in whose family during a hundred years some member, usually the eldest son, had had chorea. The patient was attacked first at the age of ten years without known cause.

The spasmodic action commenced in the hand, gradually extended to the rest of the limb, the neck, and the face. The mental disease appeared first not until half a year before he was received into the asylum. He had illusions in regard to sights and sounds. At the time of admission he was found with chronic meningitis over the frontal and parietal regions.

rather widely-extended cerebral atrophy with hydrocephalus and rigidity of the arteries, especially the coronary arteries of the heart.

On the membranes of the cord, from the origin of the third nerve, were patches of connective tissue, partly calcified, the size of a seed and larger.

N., aged twenty-nine, was afflicted with epilepsy. Family history showed no hereditary tendency. At six years of age she was thrown on the floor of the bed by the maid-servant with such force that a large gap in the skull was made, with fracture of the bone (?), followed by inflammation of the brain. The wound healed without further trouble. It was an oval-shaped, two inches long and three lines wide on the upper right the frontal bone, extending as far as the temporal bone. After several attacks of eclampsia set in, which in a short time were cured. At five years of age she fell down a flight of stone steps to the cellar. It was supposed to be from inflammation of the brain, from which she soon recovered. Catamenia appeared regularly at thirteen years. During the last years, before the appearance of the catamenia, she has had cramps in the abdomen, and headache. Three years ago the first attack of epilepsy appeared. After the attacks the patient was agitated, morose, and there appeared slowly a slight disturbance of mental faculties. During the last months repeated attacks, with symptoms of

insanity, appeared, and she was taken to the institute. After some days she became more quiet, and remembered, though dimly, the past. The epileptic attacks were frequently repeated, but she remained quiet; her perception was somewhat dulled, her judgment weakened. Illusions were not present. Speech was uncertain, stuttering. Motion of limbs not affected.

Psychical symptoms: insane agitation, nymphomaniacal character of delirium, with loss of recollection.

The attacks appeared very frequently at short intervals, yet generally more severe at the time of the menses. At the same time appeared also excessive agitation, which showed the character of great sexual excitement. At this time she was insane upon the subject of marriage, was obscene, desired men, coition, a child, and showed also, at other than the time of the intercurrent epileptic attacks, strong nymphomaniacal muscular action, even to exhaustion, and great increase of congestion, of the temperature of both head and body, and of the conjunctival injection. These paroxysms lasted five to eight days, and were repeated at intervals of two to three months. Her intellectual power decreased more and more, memory was lost, perception became duller. She finally died without any constant paralytic symptoms.

Dura mater moderately tense, the pia mater soft, rich in blood, moderately moist; cortical substance somewhat red, medullary soft, rich in blood, moist. In the ventricles some drops of serum; the left hippocampus slimmer, hard to the feel, exceedingly anæmic on section. The perpendicular ridge of the occipital protuberance deviated half an inch to the right of the median line, thereby making the left side of the cerebral cavity larger.

5.—“*L'Aplasia Lamineuse Progressive.*” (Atrophy of the Connective Tissue.) By Dr. LOUIS LANDE.

This affection is the *trophoneurosis* of Romberg, who observed the second recorded case, in Berlin, in 1837; the first being that described by Parry, in 1825. It is characterized by a progressive atrophy of the cellulo-adipose tissue, which affected the *left side of the face* in ten of the eleven cases collected by Lande in the present pamphlet.

As to causation, hereditary influence cannot be traced. The disease has been observed to commence from the third to the twenty-second year of life; four cases were of males, seven of females. The general health is not impaired.

The first symptom is a white spot, or spots, or simply a paleness of a portion of the skin of the face. The white spot enlarges and becomes depressed; the panniculus adiposus disappears; the cutis loses thickness, becomes firmly united with the deeper parts, and where it lies over bones it forms a tight band or bridle connecting them. In short, it resembles the cicatrix of a burn. The sebaceous secretion is greatly diminished; the hairs suffer impairment of nutrition. One side of the face will be that of a healthy and blooming youth, while the other seems to belong to an aged invalid; with this difference, that the skin has the very reverse of the *flabby* appearance noticed in old people.

Sometimes some of the arteries diminish in calibre. Capillary congestion occurs with normal readiness. The bulk of the muscles is less than normal, but they contract perfectly well; they are shortened, and thus distort the features. Fibrillar contractions occurred in some cases. Sensibility usually normal; neuralgic symptoms in two cases; hyperæsthesia in three; habitual pruritus, and sensation as of rubber mask, in two. The cartilages and bones become atrophied, last; and even one side of the tongue, as well as the uvula, and the larynx, are now and then similarly affected. The functions of special sense are unimpaired.

The progress of the disease is very slow; it has been known to exist for over twenty years in one instance, and has never proved fatal. It has been supposed to be sometimes arrested permanently.

The application of the interrupted current has seemed to do good in a few cases.

The author's "conclusions" are (in brief) as follows:

"This atrophy resides essentially in the cellulo-adipose tissue, both intra- and extra-organic. It affects the adipose element, the areolar tissue, and the embryoplastic corpuscles, but not the elastic tissue." [A microscopic analysis has been made.]

"The following organs are *not* primarily affected: *a.* The motor nerves; for motility is normal. *b.* The sensitive nerves; for sensibility is not impaired. *c.* The vaso-motors; for the sympathetic phenomena are exhibited upon the affected spot, equally with the healthy side of the face. *d.* The muscular elements; for the myotility is preserved intact even after a period of twenty-three years, the muscles retaining all their force. *e.* The vascular elements. *f.* The glandular elements.

"The concomitant lesions are deuteropathic.

"We cannot discover in this affection either congenital atrophy, or partial atrophy of all the tissues, or atrophy subsequent to a lesion of the great sympathetic, or progressive muscular atrophy, or neuralgic atrophy, or paralytic atrophy, etc.

"There is no proof that we ought to ascribe it to a lesion of a special system of trophic nerves—the very existence of this system is far from proved; and *a fortiori*, we must not here see the manifestation of a neurosis of this system (trophoneurosis).

"We therefore can ascribe the disease to nothing but a special affection of the *tissue lamineux*. We have instances of the hypertrophy of the latter in sclerosis of the nervous centres, progressive neuro-atrophy, progressive muscular atrophy, the first period of cirrhosis of the liver, etc.

"Its atrophy, likewise, is demonstrated by our observations, and our opinion is justified by the phenomena observed in the second period of cirrhosis of the liver, and in the ultimate modifications of connective tissue.

The term 'trophoneurosis,' employed by Romberg, prejudices the question and the pathogenesis of the affection."

b.—*Secondary Degeneration of the Cord, artificially produced.*

: C. WESTPHAL (Virchow's Archiv, xlviii., 516; Archiv für
VOL. V.

Psychiatrie, ii.). A. VULPIAN (analysis of the above, Archives de Physiologie, iii., 4.)

Prof. Westphal has lately published the results of experiments, showing that traumatic lesions of the spinal cord, in animals, may give rise to secondary degeneration of certain of the white columns.

The animals selected were dogs. Two cases only are reported, though others have been observed. A small incision was made in the skin without opening the vertebral canal, through which a pointed instrument was plunged into the cord.

In the first experiment the lumbar region was penetrated, the instrument passing forward from right to left, through the left posterior and anterior columns and the left half of the gray matter. After three months the animal was killed, and the cord was prepared with a solution of bichromate of potassa. In the second experiment the animal was killed after two months, and the track of the instrument was found in a somewhat similar position on the right side of the cord.

In these two cases it was observed that secondary degeneration attacked the anterior and posterior columns of the same side, both above and below the point of lesion; but that the posterior column was diseased much farther, *above* that point, than the anterior. *Below* the puncture, the disease reached farther in the posterior column in one case, in the anterior column in the other. At all events, these results do not quite confirm the views of Ludwig Türck, who inferred from his pathological observations that secondary degeneration of the columns follows a constant and exclusive course, ascending in the case of the posterior, descending in that of the antero-lateral.

Vulpian published, in 1869, some experiments of a similar nature, upon guinea-pigs and pigeons, which gave negative results after injuries of the brain and cord. But, upon learning Westphal's success, he renewed his own experiments, employing dogs and a rabbit for his subjects. He confirms Westphal, and adds one or two observations which he thinks peculiar. In the first place, there was remarkably little change of the antero-lateral columns, in a case in which one-half of the cord had been completely destroyed; for, only five mm. below the destroyed portion, these columns were free from any perceptible alteration. In the second place, although the affection of the posterior columns extended to a good distance, it was very striking to notice how rapidly it diminished a very little way from the seat of lesion. Finally, repeated experiments leave it quite plain that no degeneration of the cord follows the removal by section of large pieces of the cerebral hemispheres, in the case of dogs.

As for the kind of alteration that occurs, it seems to be the same as is observed after similar lesions in the case of man. In one of the dogs examined by Vulpian, the vessels of the gray matter were altered below the point of lesion; their walls were sprinkled with *corps granuleux*.

The variable nature of these results, as compared with those observed after lesions or compressions of the human medulla, leads us to infer that in the latter cases there must be some important element present besides the simple separation of the cord from its supposed

Following results were obtained from experiments on dogs. The motor was first removed, and very weak currents employed. If the convexity of the cerebrum is motor [motorisch]—(this is used in the same sense as Schiff)—another part is not. The motor part lies, to speak generally, more anteriorly, the part more posteriorly. By electric irritation of the motor induced muscular contraction of the opposite side of the body. When very weak currents are used, this contraction may be of limited muscular groups. With stronger currents, the muscles are brought into action on the corresponding side. The effect of calling into action single groups of muscles is confined to small spots, called centres. A very slight movement of the stimulus is sufficient to set in motion the like extremity. The portion lying between the centres is not excitable with the current. Using the nomenclature of Owen, the following was

the centre for the muscles of the neck is in the middle of the convolution, just where the surface of this convolution turns downward. The outer end of the post-frontal convolution in the end of the frontal fissure conceals the centre for the adductors of the fore-legs. Somewhat back of this, and in the coronal fissure, lies the centre for flexion and rotation of the hind-legs.

The points for the hind-legs is in the post-frontal convolution, but more toward the median line, and somewhat posterior. The character of the motion obtained depends on the nature of the electric irritation.

When interrupted induced currents, tonic contraction of muscles is produced which, after a little, partly relaxed. After continued irritation a few seconds, subsequent movements appeared in the dependent muscles. In two cases these movements changed into marked epileptic attacks, which began on one side and then to the other. Neither the corpus striatum nor the white

the situation of the fore-leg. The faculty of forming a perfect motion of the same was lost. There remained still some motor communication from the mind to the muscle, while the communication from the muscle to the mind was broken.

8.—*Diffused Sclerosis of the Brain and Cord.* I. Dr. W. LUTZ. Deutscher Archivs für Klinische Medizin, 8 Bänd, 1 Heft. (Wiener Medizinische Presse, November 1, 1871.)

The author communicates three very accurately-observed cases concerning this disease, which is frequently noticed in France, but in Germany is seldom observed and diagnosed during life. He shows that the diagnosis is not so difficult, because there are very characteristic symptoms which do not allow of a mistake in a diagnosis. The chief symptoms of diffused sclerosis of the brain and cord are: the characteristic trembling of the more or less paralytic extremities, and head, during movement, which latter are contracted disturbances of vision, presence of trouble in speech, the disproportion between the diminution of the motor power and the usually unimpaired sensibility, finally the presence of pain in the limbs and head, vertigo, cramp-like contraction of the lower limbs, paralysis of the hypoglossal facial and accessories and disturbance of respiration. The author from his cases can draw no conclusion as to successful treatment.

II. BENEDIKT. (Wiener Medizinische Presse, November 13, 1870, No. 46.)

At a meeting of the Imperial Medical Society of Berlin, Prof. Benedikt exhibited two cases of disease of the central nervous system in children which recovered under the use of electricity, and then spoke of a case of diffused sclerosis in which the disease began in childhood, with frequent attacks of vertigo. Then appeared symptoms of tabes, hemiparesis, progressive muscular atrophy, and mental weakness. Two years ago he treated the patient with the galvanic current, and he almost entirely recovered. In February of this year (1870) psychical symptoms appeared, and he soon died. The autopsy confirmed the diagnosis. The cerebellum and the medulla possessed the most importance, and macroscopic and microscopic examination showed, besides cerebro-spinal meningitis, sclerosis of the brain, and of the posterior and lateral columns. Though afflicted with this severe disease since childhood, the patient studied, had married with undoubted symptoms of tabes, and had brought up five children, and only died at nearly forty years of age, having two years previously been cured of the symptoms of spinal and cerebral affection. The autopsy explained these circumstances, since, besides changes in the vessels and connective tissue, there were manifold changes in the ganglia and fibres. The condition of the latter was, however, generally such that, from an anatomical point of view, it could not be decided that they were incapable of acting. In reference to the course of the disease, it is to be remarked that in diffused sclerosis the apoplectic termination is much more frequent than in the localized variety. The prognosis is much more favorable when the disease is general than when it is confined to a small compass. Diminution of work, hydrotherapeutics, and, above

all, galvanization, may for a while cause the symptoms to disappear. The occurrence of severe psychical symptoms and of fibrillary contraction seems to render the prognosis absolutely unfavorable.

9.—*Gunshot-Wound of the Brain.* CORTESE. (Lo Sperimentale, April, 1870.) Centralblatt für die Medicinischen Wissenschaften, 2, 1871.

A man, thirty-eight years old, during a duel received a shot in the head, from a distance of ten paces, directly over the right ear. Five hours later he had a slow pulse, great præcordial anxiety, inclination to vomiting, cold extremities, general nervous prostration; he answered questions correctly but hesitatingly. The ball had struck at an angle of 70°. The sound penetrated in an oblique direction eight to ten cm. It was concluded that the ball had penetrated the posterior lobe of the right hemisphere, and that it was probably firmly embedded at the point where the tentorium unites with the false cerebri; that it had only touched fibres of the corona radiata and corpus callosum, and had passed between the posterior auricular and middle meningeal; at least the external hæmorrhage was very inconsiderable, and there were no signs of greater internal hæmorrhage. The treatment was at first antiphlogistic. After some days there were pain from the neighborhood of the ear toward the occiput, vertigo, difficulty in moving the eyes, prickling in the legs, great hyperæsthesia for noises. The wound healed, but subsequently twice opened, with the occurrence of erysipelas. Finally it healed definitively, but there remained a certain weakness of memory and inability for mental exertion.

After nineteen and a half years he died from a chronic disease of an abdominal organ. At the autopsy was found under the outer depression in the bone, on the vitreous table, a dark semicircular protuberance of the size of a hazelnut, which was adherent to fragments of bone. When that portion of the hemisphere was removed which partly covered the protuberance, it was seen that it consisted of two pieces of lead between which lay fragments of bone. The whole mass of bone and lead was three cm. long and half that width, and was united to the inner surface of the squamous portion and petrous portion and at the border of the tentorium. In the brain the course of the shot began at this protuberance and ran horizontally through the entire hemisphere, a distance of ten cm., to the false cerebri. At this point adhered a fragment of bone two cm. long, of irregular shape and pointed. The channel formed by the shot easily admitted a finger, but under the microscope its walls showed normal brain structure (?).

A thin layer of cerebral parenchyma separated it from the tentorium; anteriorly it reached the anterior cornu of the right lateral ventricle, without, however, entering it.

10.—*Epilepsy in consequence of Lesions of the Cord and the Spinal Nerves.* BROWN-SÉQUARD (Arch. de Physiologie, 1870).

The experiments here described were made upon guinea-pigs.

Section of the entire thickness of the cord, or of something more than the posterior half, or of one lateral half, if performed between the

seventh dorsal and the second or third lumbar vertebræ, always produced epileptic attacks after a certain time.

The result is less certain if the section is less complete, or if other portions of the cord are chosen. Section of the roots of the fourth or fifth dorsal nerves, section of the sciatic, and usually that of the popliteus internus, will cause epilepsy.

The average time required for the complete development of epilepsy, after section of the sciatic, is about twenty-six days in the case of the male guinea-pig, and about twenty days in that of the female. In a few cases the cut ends reunited rapidly, and the animals escaped almost entirely from the epileptic seizure.

When the epileptic diathesis is established, fits may be produced at will by pinching a portion of the skin, called by Brown-Séquard the "zone épileptogène," which embraces a part of the face and neck, its longest diameter being about five centimetres.

In case of the section of the sciatic the author attributes the fits to irritation of the central end of the cut portion, which is transmitted to the brain. This transmission takes place in a crossed direction, and hence cannot follow the path furnished by the nerves of ordinary sensation. The following experiments bear upon this point: The right half of the cord of a guinea-pig was divided; he became susceptible of epileptic convulsions, which could be provoked by irritating the right "zone épileptogène;" the left sciatic being now divided, he became susceptible of convulsions, provoked by irritating the left zone.

In proportion as the skin of the face and neck loses its "faculté épileptogène," it regains its sensitiveness to pain; and a violent irritation of the skin in the "zone," in the form of a wound of one or two centimetres in length, has in three cases removed instantly both the "faculté épileptique" and the anæsthesia.

Sudden arrest, by a wound, does not depend on a *counter-irritant* action; but it may be stated that, while tickling, pressure without pain, or slight pinching, produces an attack, cutting or burning a part of the "zone épileptogène" will not only not cause an attack, but will take away from the zone its "faculté épileptogène," either immediately or within a few hours.

When sensibility is completely restored in the injured extremity, and has reached its normal grade, the epileptic attacks usually cease in the case of the guinea-pig. But the author has kept some of these animals a year under his observation without a spontaneous cure of the epilepsy.

After lesion of the encephalon in front of the protuberance, he has seen epileptic fits produced by irritation of the zone, of the *opposite* side, and much more quickly than was the case after spinal or sciatic lesions. The fibres, whatever they may be, in the nates and the pedunculus cerebri, which produce epilepsy when irritated, act in the crossed way. The part of the nervous centres which is the *essential* agent in this process is probably the same as that which, in well *an-*imals, gives rise to a complete attack when it is irritated by *section*. This part is not the protuberance, in which Nothnagel sought for the seat of epilepsy, but is a portion of the bulbe rhachidien and the cervical medulla spinalis. The author promises soon to give a more *ex-act* statement of its limits.

11.—*The Spinal Cord in Infantile Paralysis.* CHARCOT and JOFFEY. (Arch. de Physiol., iii., 1.)

A case is here reported, in which the cord was carefully examined. The patient, a girl, at the age of seven years, was suddenly stricken with absolute inability to speak; leeches were applied; and speech returned, but on the next day her four limbs were completely paralyzed. In about one year she began to regain the use of the upper part of her body; and later, she could sew, write, and feed herself; but the legs remained nearly motionless. She died at the age of forty.

The muscles were found to be very generally atrophied to an excessive degree, and to consist in great part of fat-cells. The cord showed alteration from the upper part of the cervical enlargement to the lumbar enlargement. The gray substance was chiefly affected; the posterior cornua much less than the anterior. The latter were contracted in all their diameters, and distorted; entire groups of cells, and sometimes all the cells in a given region, had disappeared, and in their place was to be seen a transparent, finely-granular substance, traversed here and there by delicate fibrils; or a very dense net-work of fibrils, single or in bundles. The posterior cornua were much less altered; the vesicular columns of Clarke were almost uninjured. The anterior roots of the nerves were atrophied in proportion to the change in the anterior cornua. The posterior columns were unaltered; the anterior columns had lost in diameter, and the trabeculae of neuroglia were remarkably thickened in some places, but there was no proper sclerosis—no atrophy of the nerve-tubes and substitution of fibrillary tissue.

Were the nerve-cells, or the neuroglia, the first to be affected? Probably the nerve-cells; for groups of them had disappeared from places where the neuroglia is entirely normal.

Was this atrophy of nerve-cells primary, or was it a result of enforced muscular inactivity? Probably it was *primary*; for, if it were secondary, there would be observed a simple atrophy, affecting white and gray matter alike.

The paralysis and the atrophy are probably results of the disease of the cord. Progressive muscular atrophy originates in a similar, though much more gradual, alteration of the cord.

It remains to be seen whether this alteration of the motor nervous cells is a constant phenomenon. Three cases have been reported, which speak in the affirmative; but other cases, as yet, are undecisive or wholly negative.

In the next number of the *Archives*, Vulpian reports a case of fatty muscular atrophy, dating from infancy, in a woman aged sixty-six. A great number of nerve-cells had disappeared from the external lateral group of the anterior cornu; and the reticulum was considerably increased in the affected places. The dorso-lumbar enlargement and the lower dorsal region were the chief seats of disease.

The cord was examined when in a fresh state, without the slightest sign of disease being discovered; its appearance was perfectly natural.

12.—*Cerebral Hæmorrhage in Leucocythæmia.* OLLIVIER and RANVIER. (Arch. de Physiol., No. 1, 1870.)

Six cases of this affection are here cited, and one new case is reported in full. The following is the synopsis of results:

Prodroma sometimes occur, such as headaches, lasting for a longer or shorter time. At a later period there are attacks of giddiness, tinnitus aurium, and sometimes even fainting turns. At a more advanced stage, hebetude, soon followed by somnolence. Finally, the patient may fall into a state of coma, which becomes more and more profound until death occurs; and death may be preceded by convulsions.

The authors distinguish three degrees of alteration in the brain, which correspond to three successive periods in the clinical history:

I. The cephalalgia, the vertigos, and the other symptoms of the first stage, are explained by the presence of an accumulation of white corpuscles, producing retardation and embarrassment of the cerebral circulation, and hence *anæmia of the brain*.

II. As the tension increases, the capillaries dilate, and *the brain is compressed*; the symptoms are hebetude and somnolence.

III. Hæmorrhage, *destruction of cerebral substance*, coma, and death.

In a case of leucocythæmia, the occurrence of any symptom of the three series above-mentioned is of importance in relation to prognosis.

The seat of the hæmorrhage varies much; it may be arachnoidal, or sub-meningeal, or intra-cerebral (in a great variety of places), or may even take place within the lateral ventricles.

Paralysis was noted only once in the seven cases related. In explanation of this fact, it is remarked that there is great disturbance of the cerebral circulation—stasis of the white corpuscles, and distention of the vessels—at the time when hæmorrhage occurs; and this state of circulation induces coma, which masks the symptoms proper to hæmorrhage.

13.—*Sensitive Nerves concerned in the Reflex Phenomena of Deglutition.* WALLER and PRÉVOST. (Arch. de Physiol., 1870.)

When the central end of one of the superior laryngeal nerves was excited continuously by a feeble induced current, the arrest of the diaphragm in expiration (noticed by Prof. Rosenthal) was observed, and, in addition to this, rhythmic movements of deglutition.

Movements of deglutition have been obtained by irritating the central end; *a.* Of the recurrent nerves; *b.* Of the vagi, when the stimulus was applied above the origin of the superior laryngeals; *c.* Of the glosso-pharyngei, in the dog and cat, but not in the rabbit.

In a series of experiments made upon the latter animal, the larynx, pharynx, and mouth were opened, and irritation applied to the various portions of mucous membrane—the different nervous branches being eliminated by successive section. The results were as follows:

a. The glosso-pharyngeus does not contribute to the reflex phenomena of deglutition, in the rabbit.

b. The trigeminus is the principal sensitive nerve presiding over

1. After its section upon one side, irritation of the cor- side of the palate fails to provoke deglutition.

superior laryngeal assists in the reflex action, by supplying membrane of the epiglottis and of the aryteno-epiglottid- ant which covers the upper borders of the laryngeal open- incipally, that which covers the conicula.

recurrent nerve contributes to these phenomena by its sen- nts.

has often been observed (in cats and dogs) when the trunk rior laryngeal, the recurrent, or the glosso-pharyngeal has ed. In the rabbit, cough has sometimes been observed lization of the latter nerve.

50 *Cases of Paralysis of the Forearm after Dislocation of the Humerus.* M. BERNHARDT. (Berliner Klinische Wochen- 5, 1871.)

number 14, 1867, L., forty-three years old, dislocated his : by falling on his left shoulder. He had pain in the shoul- nd it impossible to move his arm, and that felt cold. The was found to be subcoracoid, and after eight days it was the pain ceased, but the paralysis continued. In the palm l there was, after three weeks, considerable scaling of the Pressure on the shoulder was not painful, but a strong : triceps and of the muscles of the forearm was unpleas- ionally, there was a sense of formication from the middle down the extensor side of the forearm to the ends of the e left arm could be raised in a straight line forward about out could not be carried backward nor across the breast. i could not be bent on the arm, only the supinator longus d tense. Extension was impossible; supination was slight. ould be raised somewhat. Adduction, and abduction of exion and extension of the fingers were impossible. The needle was felt to the upper border of the lower third of both sides equally. In the lower third of the left arm, in oint, and the upper part of the forearm, the skin is more the right than the left. In the rest of the forearm, in the igers the sensation is a little less on the left than right, but l. The muscles of the arm and forearm, of the hand and ll as the deltoid, showed only the slightest reaction to the urrent. Likewise the use of a very strong galvanic current rve or muscle, by opening or closing, failed to produce con-

ie 5th of January, every other day the patient was treated g galvanic current, the anode and the cathode being placed yzed muscles. After four weeks he could raise the arm s, also some distance backward so as to touch the right h the left hand. Also, he could bend the forearm on the d some motion in the hand and fingers. After eight weeks n was nearly restored.

uary 7th, F., sixty years old, fell on the left shoulder.

There was found subcoracoid dislocation five days later. There was no power to move the arm at the shoulder, and only slight power over the forearm and hand. Numbness with pricking was felt in the forearm and hand. There was but little improvement under the galvanic treatment.

15.—*Physiological Action of Hyoscyamia and Daturia.* OULMONT and LAURENT. (Archives de Physiologie, 1870.)

Numerous experiments have been performed by the authors upon animals and men; the drugs have been administered both internally and subcutaneously; and the general conclusion reached was to the effect that their action is analogous to that of belladonna, except that the severe symptoms of intoxication are absent.

The following are the general conclusions:

1. Hyoscyamia and daturia act specially upon the great sympathetic system.
2. In small doses they diminish the capillary circulation; in large doses they cause a vascular paralysis.
3. The arterial tension increases after the administration of small doses; after toxic doses, it diminishes. Section of the pneumogastric nerves does not alter these results.
4. The pulsations increase in number and diminish in volume.
5. Hyoscyamia regulates the rhythmic movements of the heart; daturia often produces intermission or arrest of these movements. Applied directly to the heart, they diminish the frequency of the pulsations, and cause a total arrest of the heart's action.
6. They always hasten the respiration.
7. They possess no direct action upon the nervous system of the life of relation. Sensibility and motricity are not modified. In toxic doses, they blunt the peripheral sensibility.
8. They have no action upon the excitability of striated muscle; they do not modify the structure of the latter.
9. In small doses, they accelerate the movements of the intestine; in large doses they paralyze them.
10. The general symptoms observed are due to modifications of the circulation. They disappear rapidly, since the alkaloids are rapidly eliminated. The chief mode of elimination is by way of the urine, in which the alkaloids may be discovered.
11. The dilatation of the pupil is due to an excitation of the great sympathetic; the third pair of nerves is not concerned in producing mydriasis.
12. Small doses cause, generally, a slight rise of temperature; large doses lower the central temperature.

16.—*The Functions of the Trachea in the Act of Respiration.* LEVEN. (Arch. de Physiol., 1870, No. 1.)

Hitherto the trachea has been considered by most physiologists as an inert tube for the passage of air. Sudden death, however, has often been observed during tracheotomy, and as a consequence of fracture of the larynx. The author explains these facts by stating that the

are instantly arrested, and sudden death occurs, preceded by three convulsions.

If the pneumogastric nerves be previously cut, the ligature will not cause death, but death by asphyxia from CO_2 .

Constriction of the trachea will give rise to coma from asphyxia; if then the cord be tightened the respiration is instantly arrested and if it be drawn so tight as to obliterate the trachea sudden death occurs.

There are three distinct processes, classed as "asphyxia," which are distinguished from each other. These are:

1. Asphyxia by compression of the trachea, to which is due the asphyxia of the pneumogastric, and, consecutively, to irritation of the medulla oblongata.

2. Asphyxia by submersion. In this case, the trachea fails to receive its supply of oxygen, the medulla remains inert, and death occurs after cessation of respiration and circulation, after the animal has made one or four respirations, provoked by the oxygen remaining in the lungs. These two forms ought to be considered as syncope.

3. Asphyxia from carbonic acid, which may be superadded to either of the other two forms, but is strictly secondary and exceptional. Experiments upon carbonic acid showed that its action is essentially the same, whether respired pure or mixed with atmospheric air; it causes no excitement, and no convulsive movement; that it does not impair the contractility of the heart, and stupefies the brain and medulla oblongata, but does not impair the reflex functions of the cord, the logical properties of the nerves, or the contractility of the muscles. When asphyxia is prolonged, the temperature falls, and the blood, and the viscera, contain a great quantity of sugar.

Elevation of the Temperature of the Brain during Sensorial Irritation. MORITZ SCHIFF. (Arch. de Physiol., 1, 2, 3,

Temperature of the brain was measured, in these experiments, by passing an electric pile, in the form of a needle, composed of two needles, through holes in each side of the skull of dogs and other animals. During the first week, at least, these needles produce nothing more than an insignificant hyperæmia in their own neighborhood. After the operation the animals do not need to be narcotized, and they are generally quiet.

Stimuli applied to the sensitive nerves affect both hemispheres, producing a rise of temperature on both sides.

If the animal was narcotized, the temperature rose if it was startled by a sudden, shrill sound. It remains doubtful whether

this is due to simple perception, or to the reflex mental activity evoked by it.

Stimuli applied to the nerves of smell, of hearing, and of sight, produced a marked effect.

Hens furnished desirable subjects for this experiment, because they can be kept immovable for hours if simply placed in a certain position. Passive movements of the head cause no rise of temperature, but sudden impressions made upon the senses of hearing and sight, and food thrown to them, cause a sudden rise. With the sensorial impression, in these cases, there seems to be associated a psychical influence; the first few impressions are stronger, as measured by the heat evolved, than subsequent ones, but, after a certain number of repetitions, when the impression of fear, or other psychical action, has ceased to be felt, the sound, or other stimulus, produces a uniform rise. The amount of heat generated by psychical influence is greater than that caused by sensorial influence.

The circulation is not the agent whereby this rise in temperature is effected. The following reasons are given for this statement: 1. The temperature does not rise equally on both sides, as it ought, if the circulation were the cause; 2. In the rabbit, nervous excitation slows the heart, while raising the cerebral temperature; 3. A normal pulse-curve was found to exist while the temperature was rising, in one case; 4. The rise may continue ten or twelve minutes after the heart has ceased to beat; 5. It was observed, in one case, fifty-two minutes after decapitation; 6. After section of the cervical sympathetic, or of the auriculo-cervical, the temperature does not rise under psychical or sensory excitement.

18.—*Psammomata—Sandgeschwülste—Tumeurs Arénacées*. STRUDENER, of Halle. (Virchow's Archiv., vol. L, 2.—Med. Chir. Rundschau, September, 1870.)

The term psammoma is properly applicable to those tumors only which are composed of a tissue that grows slowly, with scarcely any tendency to multiplicity, and occupies a middle place between proper fibromata and the firm sarcomata with spindle-cells; embedded in this tissue are found numerous calcareous bodies, which may be globular with a concentric arrangement of layers, or may take the form of needles or trabeculae.

L. Meyer derived the elements of the psammoma from the epithelial cells of the arachnoid; a view which Robin has lately tried to bring into repute. Cornil and Ranvier, on the other hand, explained the sandy particles as real phlebolites, originating within tufts of vessels, or ampullar dilatations of the vessels; to these vessels, when obliterated, the pedunculated bits of sand remain hanging. Virchow places the greatest part of these bodies in the series of the concretions; he believed them to belong to no organized formation, in the stricter sense of the term; even the smallest showed marks of lamination, and the larger ones often presented no nuclei or cells; this circumstance would speak decidedly in favor of their non-organic origin.

Virchow thinks that a decision would be inadequate which should be made entirely in favor of one side of this question.

Steudener, while by no means denying that the cretaceous bodies originate in the way indicated by Virchow, considers himself as compelled to modify this view. It cannot account for the great majority of these bodies. Without doubt (he thinks) many of those which are concentrically arranged take their origin from cells that become fused together, lose their nuclei, and change into homogeneous cells, with a concentric arrangement, in which the salts of lime are afterward deposited. This deposition sometimes starts from one centre, often from several, giving irregularity to the form.

19.—*Pathogenesis and Treatment of Tetanus.* ARLOING and TRIER. (Arch. de Physiol., No. 2, 1870.)

Experiments made upon rabbits and a dog, by injecting into their muscles pus and blood from patients dying of tetanus, proved negative. A horse was similarly injected with blood from another horse affected with tetanus; result negative. Mechanical and galvanic irritation of the nerves of frogs, rabbits, dogs, and horses, proved incapable of exciting tetanus, though the irritation was made very severe and painful.

The thermometer furnishes very exact information in regard to the progress and the mode of termination of tetanus. If the rectal temperature remains below an average of 38° , the prognosis is favorable; the moment it reaches a high figure (an average of 39° or higher) the prognosis becomes bad; the nervous centres are probably affected. The authors advise section of all the nerves of a limb as high as possible in case tetanus arises from a wound in the limb.

20.—*Alterations of the Different Classes of Sensibility in Lead-poisoning.* MANOUVRIEZ. (Arch. de Physiol., 1870, No. 3.)

Analgesia is almost always absolute; indifference to pricking or burning, rarely extending over the whole body, more often over the right half, and particularly manifested in all its intensity in the right distal member, more especially in the hand and wrist.

With this free analgesia *anæsthesia* is almost always found, selectively by preference the right side, the arm, and the lower parts of the body. This anæsthesia is liable to be overlooked if not searched for with the æsthesiometer, although in one case the limbs of that instrument were found to deviate 68 mm. on the forearm. Sometimes there would seem to have been hyperæsthesia of the face, especially on the side opposite to the motor paralysis.

The *sensibility to temperature* is almost always notably diminished, rarely to the point of total insensibility. *Sensibility to tickling* is quite lost. Both prefer the right side, and the arm especially, for their seat.

The *muscular sense* and the *faculty of recognizing* the place where a sensitive impression is made seem to be nearly or quite unaffected.

These various forms of paralysis, however, occupy the right side of the body when the motor paralysis and the pains are also on the right.

In general, the observations made by the author show that the va-

rious kinds of sensibility may suffer impairment, independent of other.

21.—*Asthenia or Anæsthesia produced by Pressure upon Nerve.* AUG. WALLER, Geneva. (The Practitioner, Decem

The author has found that pressure upon the *vagus* in th in some instances produce instantaneous loss of consciousness: er over the voluntary muscles. A certain amount of debilit invariably the consequence of vagal pressure, resulting entirel from incident influence on the medulla oblongata, and evid cially by failure of the cardiac force, and loss or decrease c in the carotids. Though (in the most marked cases) the pati as if struck by lightning, apparently dead, he recovers very e pression of the *vagus* is perfectly free from any danger what Dr. Waller has used it in the most varied circumstances, an witnessed any instance whatever to inspire him with anxiet as to any fatal consequence. The heart is always found to and the respiration in play; indeed, the physiologist kn means of permanently affecting the muscular irritability o by any agents, either mechanical or electrical, applied to t the *vagus*. Chloroform, on the other hand, gradually dest ribility of the heart, proceeding so insiduously that de imminent without our being aware of it. The author re of successful reduction of a very difficult dislocation of th joint, after two or three minutes of simultaneous compi traction; likewise a case of painless extraction of a tooth.

22.—*Electrical Excitability of the Brain.* EDUARD HIT Med. Gesellschaft, April 6, 1870.)

The author, in conjunction with Dr. Fritsch, found cer innervation in the hemispheres of the cerebrum of dogs. I tation applied to these spots always sets certain groups of action, and the authors affirm that they have demonstrate ence of such foci for the great part of the voluntary muscles currents induce very extensive muscular twitchings. Usual ure of the galvanic current causes a simple contraction, whi with the tetanizing induction-current produces at first a n contraction, quickly followed by a considerable diminution. evidence that the irritation of the cerebrum was the true c muscular contractions is found in the fact that they took the opposite side to that irritated. When the posterior irritated, no contraction occurred.

The author extirpated in part "the centre governing the leg" of a dog. After the operation the animal suffered slight weakness of the limb; but had manifestly lost, in gr consciousness of the condition in which the leg might cl He made false steps, and permitted the leg to remain i attitudes.

23.—*Action of Strychnia on Frogs.* A. VULPIAN. (Arch. de Physiol., 1870, No. 1.)

The author endeavors to bring evidence in regard to the question whether there is a real histo-chemical difference between the sensitive and the motor nerve-fibre. In his experiments he rejects curare, considering that it acts by interposing an obstacle, of unknown nature, between the motor fibre and the primitive muscular fasciculus, without impairing the special physiological properties of either element. And, as the result of his experiments, he affirms that strychnine is not a poison, either for the motor or the sensitive nervous fibres, but that its primary and essential action is upon the nervous centres. Hence, in his opinion, these two poisons furnish no means of discriminating between the two classes of motor and sensitive nerves.

24.—*The Sympathetic as related to the Secretion of Urine.* PEYRANL (Acad. des Sciences, June 13, 1870.)

The results of galvanization and faradization of the cervical sympathetic in animals, both before and after section (in the latter case, the excitant being applied to the peripheral end), were compared with the results of simple section of the nerve. Six hours was the duration of each experiment.

1. Urine and urea are increased in proportion to the force of the voltaic current, if the nerve is uncut.
2. The induced current produced a much more marked effect than the constant current of the same intensity.
3. Simple section of the nerve reduces the urine and the urea to a minimum.
4. Galvanizing the peripheral end of the cut nerve does not raise the urine, etc., to the normal amount; the quantity secreted under this stimulus is greatly inferior to that obtained during excitation of the ~~same~~ nerve.

25.—*Aphasia and Hemiplegia after Scarlatina.* EULENBURG. (Berl. Med. Gesellschaft, July, 1869.)

Dr. Eulenburg presented to the Society a boy, aged eight years, who had had scarlatina two years before. In the sixth week convulsions and coma appeared, and subsequently paralysis of the right side of the body and face, with aphasia. The paralytic symptoms nearly disappeared in two weeks. The boy speaks only two words; "ach," which he always uses for "nein," and "ja," which he applies to all other uses.

The fact that dropsy and albuminuria had existed induced the author to infer the presence of softening of the central organ of speech, of a dropsical or necrotic character, referable to anæmia. The prognosis in respect to the aphasia was doubtful. It is not stated whether the boy had had endocarditis.

26.—*Influence of Injury of Certain Parts of the Brain upon Temperature of the Body.* BRUCK and GÜNTHER. (Pflüger's Arch., 578-584. Centralblatt f. d. Med. Wissenschaften, No. iv., 1871.)

Tscheschichin has incidentally communicated a proof of the experiments made under the direction of the reporter, in which, after separation of the medulla from the pons, there was increase of temperature of the body, and thereupon concluded the presence of centres regulating the production of heat. Bruck and Günther were able twice, in seven experiments, to prove a considerable increase of temperature after that operation. But yet more effectual than separation of the medulla is the effect of simple puncture in the region of the posterior edge of the pons, and the anterior edge of the medulla. Not only in the rectum but also on the surface under the skin, there was found increase of heat. Hence, it may be concluded that a true increase of heat occurs; further, the acceptance of a regulating centre seems unsuitable—rather, should the increase of temperature be considered as a result of irritation, since punctures are more effectual than division. Indeed, a sudden rise of temperature may be produced by electric irritation of the boundary between the pons and medulla, only the observations become uncertain from the frequent occurrences of chronic cramp.

27.—*Epileptiform Convulsions after Spinal Injury.* DR. NER SZONTAGH. (Wiener Med. Presse, No. 5, 1871.)

After a fall, a man had convulsions, which became more frequent and of longer duration, varying from tonic to clonic in character. About the tenth dorsal vertebra was a scar, which was sensitive to pressure, which accelerated the clonic spasms, and increased their duration. The scar was $\frac{3}{4}$ ctm. deep. At another examination it was only $\frac{1}{2}$ ctm. deep, and later still was even with the skin. Pressure and the constant current applied to the scar between the paroxysms caused slight intimations of muscular contraction. There was considerable loss of substance of the vertebra, but a complete loss of the bony covering of the cord could not be determined.

28.—*Progressive Muscular Atrophy.* Allgemeine Med. Central-Zeitung, No. 7, 1871.)

M. Rosenthal reports a case which improved under galvanization of the nerves and faradization of the smaller muscles. The patient died, after fourteen weeks, from dysentery.

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[No. 3.]

ORIGINAL COMMUNICATIONS.

ART. I.—*The Sphere, Rights, and Obligations, of Medical Experts.* By JAMES J. O'DEA, M. D., of New York.
(Read before the New York Medico-Legal Society, April 13, 1871.)

Not much is known of the application of medical knowledge to the end of jurisprudence in the earliest historic times. The ancient Roman law-courts had a short and easy method for settling doubtful medico-legal points by referring them to the "authority of the learned Hippocrates." But under the imperial sway, when the study of jurisprudence underwent its wonderful development in the reigns of Justinian and his successors, a serious attention was attracted to the subject, and rules relating to its practical application were embodied in those famous compounds of state and judiciary law, the *Pandects*. Still, the actual beginning of the system, such as we now enjoy it, dates from so late as the commencement of the sixteenth century. In those days the experiment was not always attended by happy results, for, naturally enough, medical men shared in many of the ignorant beliefs of the times, and lent the force of their opinions to sustain them. But,

notwithstanding this drawback, it soon gave promise of such good fruit that it was deemed necessary to frame a body of rules for the employment of medical witnesses, and for their guidance in the new duties assigned them. These rules are contained in the celebrated "*Constitutio Criminalis Carolina*," decreed by Charles V., Emperor of Germany, at the Diet of Ratisbon, in 1532. It is there ordained that medical practitioners shall be called to investigate all cases of death "by wounds, poisons, hanging, drowning, or the like; as well as cases of concealed pregnancy, procured abortion, child-murder," etc.—(Paris and Fonblanque's *Medical Jurisprudence*, vol. i., Introduction, pp. 9, 10.) The numerous works on medical jurisprudence which succeeded the publication of this code amply attest the interest it awakened among the medical men of the day. About the first was a treatise by a German doctor, Johannes Bohn, on the subject of mortal wounds, entitled "*De Renunciatione Vulnerum*," published in 1689. The same author produced in 1704 a more comprehensive work, giving copious rules for the guidance of medical evidence in courts of law; and in Valentine's *Pandects*, the physicians of the day had, according to good authority, "a compendious retrospect of the opinions of preceding writers on juridical medicine."—(Paris and Fonblanque's *Medical Jurisprudence*.)

At first the right to testify in courts of law was restricted to surgeons. Two were appointed in every city and town to examine "all wounded or murdered persons," and to report the facts to the proper tribunal. But in 1692 physicians were included, and henceforth discharged similar duties. Such, at least, was the early progress of this novelty in Germany. The French adopted and improved upon the German institution. After the publication of the Caroline Code, Francis I. decreed that both "physicians and surgeons should be legally required" to act in a medico-legal capacity. Subsequently, Henry IV. conferred on his court-physicians the privilege of nominating surgeons in every town "to the exclusive right of exercising this important duty." Finally, Louis XIV. decreed that physicians must always be present with surgeons at the examination of dead bodies.—(See Foderé's *Traité de Méd.*

Leg., vol. i.) A pleasing example of the authority of medical opinion with courts of inquiry, even in those days, is narrated by Pigray in his *Chirurgie* (liv. 7, chap. 10, p. 445). It appears that seven men and seven women were sentenced to death for sorcery, and that M. Pigray, with three professional associates, was appointed to visit the condemned in company with the court counsellors, to investigate the truth of the charges contained in the written deposition made against them. The result of the inquiry was a recommendation to the court to remove the sentence of death and to place the fourteen prisoners, whom they discovered to be lunatics, under medical treatment, and we are told the court was wise enough to follow the advice. The progress of opinion was slower in England, for we read that, more than a quarter of a century after the occurrence just mentioned, Sir Thomas Browne, author of the fascinating book "*Religio Medici*," bore "testimony to the reality of diabolical illusions, occasioning by his evidence the conviction and condemnation of two unfortunate persons, who were tried at Bury St. Edmonds before the Lord Chief-Justice Baron Sir Matthew Hale, on the capital charge of bewitching the children of a Mr. Pacey, and causing them to have fits."—(Paris and Fonblanque's *Medical Jurisprudence*, Introduction, p. 28.) But this was in the reign of James I., whose obsequious Parliament enacted a law against witches, in the preparation of which men even such as Coke and Bacon took an active part. It was not until the *furor* had spent itself in the execution of some forty thousand men, women, and children, that the persecution was finally stopped by the efforts of Chief-Justice Holt. Among the last to suffer death in England were two women, executed on the grave charge of having, the devil willing, raised a hurricane by making a lather of soap and pulling off their stockings. But I must ask pardon for this digression.

Undoubtedly, the American physicians are among the most industrious laborers in the field of medico-legal research. So early in the history of the republic as 1810 Dr. Rush drew attention to the subject in an introductory lecture delivered before the University of Pennsylvania, dwelling on the value of medical testimony as an aid in the vindication of oppressed

innocence and the punishment of crime. Since then the whole field of medical jurisprudence has been traversed in numerous American works of recognized ability and authority. I need only mention those of Beck, of Wharton and Stillé; and two valuable productions on medical evidence to which I am much indebted for the preparation of this paper, namely, Dr. Elwell's "Malpractice and Medical Evidence," of which the third edition, revised and enlarged, is recently published, and the excellent treatise on the "Jurisprudence of Medicine," by Prof. Ordronaux.

I.

The word *expert* means, etymologically, "taught by use, practice, or experience." It therefore denotes one who has a practical knowledge of some science or art. Now, in the case of the medical expert this practical knowledge is only of sterling value to the cause of justice when reared on a solid basis of scientific training. This fact our law-courts do not seem sufficiently to recognize, and it is precisely because they do not recognize it that the question "What constitutes a medical expert?" receives even at this day conflicting answers. Thus, while in some cases (as in *Page vs. Parker*, 40 N. H., 47) it was ruled that, in questions of skill or science, mere opportunity for observation was not enough, it being necessary that the witness should have superior skill and scientific knowledge, and also a mastery of the subject; in others (e. g., in *N. Orleans & Co. vs. Allbritton*, 38 Miss., 242) it has been held that practising physicians without medical diploma or license from an examining board stand on an equal footing in this respect with the most thoroughly-educated medical men. And in the *Livingston* case it was the judicial decision "that any practising physician is competent to express an opinion as an expert on a medical question."—(Ordronaux, *Jurisprudence of Medicine*.)

A medical expert, properly so called, is one specially qualified to give opinions on facts having a medical nature and bearing. Of course, this definition will exclude all who, though recognized as physicians by the amended statute, are not legitimate members of the profession. Moreover, it will discrimi-

nate between members of the profession itself, and with propriety, I think, for, apart from the fact that some physicians are, by reason of certain advantages of training and observation, more entitled to the position of experts than others, there is no doubt that the interests of justice and the reputation of our cloth require some classification of medical witnesses more in accordance with facts and experience. Presuming this to be true, I may classify them :

A.) As physicians and surgeons. This might answer, though still imperfectly, in countries where medical and surgical practice are conducted separately. But where such is not the custom, it is open to the serious objection of not being in accordance with fact.

B.) As medical witnesses and medical-expert witnesses. This is not only the most natural but also the most widely applicable division, being based on a real difference in the character of medical testimony ; and, although not generally recognized in our courts of law, it certainly, if unconsciously, influences the weight which judge and jury attach to separate medical testimonies. Let me be permitted to show the nature of this important distinction. *Medical witnesses* testify to familiar medical facts, and deliver opinions based on that knowledge of the general principles of medicine which all medical men should have. The value of their testimony will therefore depend on the range of their general medical information and experience, and not necessarily on a minute acquaintance with some special medical branch. On the other hand, *medical-expert witnesses* testify to special medical facts, and deliver opinions on a more or less minute and exhaustive study and experience of some particular medical subject to which they have devoted special care and attention. As an illustration of my meaning to those to whom it is not already sufficiently obvious, suppose an investigation into an alleged murder by strychnia, and medical men summoned to give testimony. He who has a knowledge of the effects of strychnia and of its obvious properties will testify to these. He will state that it is white, intensely bitter, a valuable medicine in proper doses, a powerful poison in overdoses. And he will tell how much an overdose is, how it causes death, and what

diseased appearances it leaves on the body. But if he were required to extract strychnia from this body, to prove chemical tests this substance to be nothing but strychnia, and to explain the comparative merits of these tests, he might decline by acknowledging his special inability. The court would have to seek the opinion of an expert in toxicology, who in turn would testify with authority on this branch from having a special knowledge of it. The former of these would be a *medical witness*, the latter a *medical-expert witness*.

There is no doubt, I believe, as to the reality of this distinction, nor as to the importance of its full recognition in courts of law. One of the reasons of the dissatisfaction expressed now and then, in regard to medical testimony, is the unreasonable anticipation of its performance, leading to the common injustice of expecting an exact and minute knowledge on medical topics from all medical witnesses. Next to such an unreasonable expectation is the greatest foe to character. Highly prevalent is the false notion that physicians have an intuitive knowledge of their profession—like poets are born, not made—and that “he is no doctor,” as it is said, who can’t give a solution of any medical question that may be sprung upon him. Nor will this habit of thought excite surprise if we remember how it is kept alive by a certain class of medical practitioners who feign a mysterious knowledge of the healing art. These are the quacks of whom Dr. Parr said that “they endeavor to obtain confidence by pompous pretences, mean insinuations and indirect promises.” I would press this classification to the attention of legal men in the hope that it may have some weight in influencing the expectations they may in future form of medical witnesses.

Sometimes, as the following example will show, exceptional circumstances have rendered this classification impractical. In the State of Iowa one Hinkle was tried for poisoning his wife with strychnia (6 Iowa R., 380, quoted from *Elwell Malpactice*, etc.). Two physicians stated in evidence that they had never tested for poisons, though they understood the principles of chemistry, and had seen tests applied by chemists. An exception taken to the admissibility of their evidence was overruled on the ground that “to say that none shall be

mitted to give their opinions, except those who have given their lives to chemical experiments, or those of the highest professional skill, would, in this country at least, render it impossible in most cases to find the requisite skill and ability." In reflecting on this decision it is but fair to remember that it was influenced by necessity. Still, in a trial involving so much of last consequence to the accused, a successful effort might have been made to procure elsewhere the services of a medical expert. Even the "highest professional skill" is compatible with comparative ignorance of some special medical subject, and I cannot but think it hazardous to admit the testimony of such witnesses to be conclusive on a question of chemistry and toxicology.

Experts are called to explain to a jury the meaning of certain facts which might not otherwise be known. Most trials involve some such facts, and are inconclusive without assistance from expert testimony.

The expert testimony of medical men is the most important of all, for it requires a most minute, varied, and extended knowledge; it frequently relates to subjects of an intricate and recondite character; it is applied to the settlement of questions affecting the three great interests which men most love, namely, life, reputation, and property.

Two examples will illustrate its great value. The first is an instance of a crime discovered, and of the criminals punished, by the instrumentality of medical science, after all ordinary means had completely failed.

In the year 1821 a woman disappeared mysteriously from the city of Paris. A suspicion that she was murdered led to the arrest of several suspected persons, who, however, were soon liberated, owing to want of proof of their guilt. After eleven years the remains of an unknown corpse were exhumed in one of the city gardens. They were examined by Orfila, Chevallier, and other famous experts, with the result of identifying them with the published description of the murdered woman, and the rearrest and conviction of the previously discharged criminals.

The second illustrates how an innocent man was, perhaps, saved from an ignominious death, at least freed from a crush-

ing imputation, by the intervention of the same species of testimony.

Thomas Bowman was accused of murdering an illegitimate child by piercing its head with an awl. The skull was produced in the coroner's court, the hole was plainly visible by all the jury. There was no doubt about the case, and the accused was held to stand his trial for wilful murder. The grand jury sitting in Exeter, England, examined the facts, and were about to bring in a true bill, when Mr. Seldon, a noted surgeon of the neighborhood, heard what was going on. Suspecting some great mistake, he appeared before the jury and asked to see the skull. Perceiving at a glance that the hole was only a natural opening for the transit of a vein, he lost no time in so demonstrating it to the satisfaction of the jury, who, thereupon, procured the honorable discharge of the accused.

The *Quarterly Journal of Foreign Medicine and Surgery*, in alluding to the importance of the medico-legal function, says: "It is such duties, ably performed, that raise our profession to an exalted rank in the eyes of the world; that cause the vulgar, who are ever ready to exclaim against the inutilité of medicine, to marvel at the mysterious power by which a atom of arsenic, mingled amid a mass of confused ingesta, can still be detected. It does more: it impresses on the minds of assassins, who resort to poison, a salutary dread of the great impossibility of escaping discovery."

II.

The sphere of the medical expert is practically coextensive with civil and criminal jurisprudence; but, as it would be impossible within the limits of this paper to do even scanty justice to the subjects thus embraced, I must confine myself to some remarks on his evidence as delivered in a court of law.

Expert testimony begins where ordinary testimony ends. Ordinary witnesses testify to facts of which they are personally cognizant. Their opinions are not usually of any value. But it is otherwise with the expert witness. He does much more than bear testimony of facts, for he delivers opinions not only

on those he has himself observed, but also on such as ordinary witnesses may have stated on oath. His method of procedure is like this: he observes facts, or listens to their recital, in doing which he weighs and classifies them, and, after their due examination, rises to a conception of the general principle of which they are the expression. The stating of this conception in appropriate language constitutes the delivery of an opinion. It hence follows that his function is judicial as well as testamentary, for he interprets the meaning of certain medical facts just as the judge on the bench decides the law. His position on the witness-stand is therefore exceptional *quoad* his testimony. Such is the dignified character of his office, but necessarily it has limits, and with these it is his duty to be acquainted. "He should," writes Prof. Ordronaux, "understand at the outset that he is not called to express any opinion on the merits of the case; that he has no proper concern in its issue, and, by whichever party called, he is in no wise the witness, much less the advocate, of that side. . . . His duties are properly limited to gauging the value of certain facts as they appear in evidence—facts whose importance to the issue cannot be determined without his assistance."

The fact, then, that medical testimony chiefly consists of reasoned opinions on statements made in evidence, and the necessity of limiting the expression of opinion within definite bounds, have led to the institution of certain rules by which it is to be guided. The majority of these rules are scattered throughout an almost endless succession of law reports, and are nearly inaccessible to all but students at law. I will just mention a few, at the same time directing those, who wish to see references to some of the latest, to the appendix of Dr. Elwell's work on Malpractice and Medical Evidence.

A medical witness is not allowed to express an opinion on facts requiring no special knowledge for their comprehension.

He is not allowed to base an opinion on the opinion of another expert.

His opinion should be formed on a personal examination, not on the report of another physician. At first sight it may seem inconsistent that he should be asked an opinion on facts reported by common witnesses, but debarred from giving one

if based on the statements of qualified men. But the inclination is due, no doubt, to the statement of the commonness being rendered under oath.

It has been ruled—and this corroborates what I have said regarding the importance of putting in practice a classification of medical testimony—that a medical witness is not competent to deliver an opinion on insanity unless he has had experience in the treatment of this disease. The wisdom of this decision will be obvious to all who appreciate the nature and great difficulties which beset the diagnosis of some cases of insanity.

“A medical witness may, when the issue is sanity or insanity, be asked whether such and such appearances, testified to by other witnesses, are, in his judgment, *symptoms* of insanity; but he cannot be asked if the act with which the defendant is charged is an insane act; for this is a fact to be decided by the jury.”

The expert must be confined in the expression of his opinion to the subject on which he has special knowledge.

As time passes and many things remain to be said, I beg you to be content with this very meagre outline of the sphere of medical testimony, and to permit me to pass immediately to the second part of my subject—the right of the medical expert.

First of these in order is his right to compensation for his labor and opinion. This is generally conceded by the law, on the common-sense ground, I suppose, that as his labor and opinion are his capital, no one has a right to use them without returning interest. The opposite view implies the principles of communism to that extent. But, though common in the courts, there is a popular prejudice against it, and it is commonly objected to medical men that they are actuated by mercenary motives in requiring compensation for their testimony. Adopting the prevalent fallacy, *post hoc ergo propter hoc*, who make this charge have inferred, from the fact that some medical men do receive money for their testimony, the opinion that therefore they sell their testimony for money. The charge would be a very serious one if true. But, in my opinion, it could not be wider of the truth. I don't believe money

prize which medical men seek in ascending the witness-stand. Nor, to take lower ground, do I think the ordinary compensation sufficient of itself to tempt any wise member of the profession to undergo the slow torture of a trial and "the law's delays." The desire of fame may indeed influence some, though, I think, not many, and these perhaps only once in a lifetime, or until they cease to be novices to the situation. I really believe, despite the cynical sneer which the announcement may cause among "dollar-getters," that the motives actuating medical experts who enter upon the position are love of scientific investigation, sense of moral duty, and zeal for truth and fair play. But, waiving this paltry objection aside, is there any sound reason why medical experts should not be paid for the labor, time, and trouble, they take in aiding judicial investigations? Let me dismiss the subject by a quotation from a manly letter addressed by Dr. Hammond to the *N. Y. Tribune* of May 24, 1870. "While," he wrote, "I hold it to be my duty as a good citizen to testify at any sacrifice to facts, my opinions are my own, and I will not give them, unless I please, without a remuneration in some degree commensurate with the time and labor spent in their elaboration." It only remains for me to say that the fee should be stipulated for before the opinion is given or the cross-examination begins, for, once it is allowed to pass into the *res gestæ* of the trial without this proviso, the witness ceases to have any right of property over it.

The medical expert has a right to the courtesy of counsel. Sometimes, I fear it must be said, counsel shows him little consideration. A certain degree of hostile criticism is usually to be expected from lawyers in the interests of their clients, but it is too often carried beyond the bounds of moderation. It may insure a lawyer's triumph to belittle the expert in the opinion of the court, or it may conduce to the success of his cause, but there are other and more honorable means of securing these short of assailing a physician's reputation. We may indeed find a reason for the latitude allowed to lawyers in this particular, in the following words from Chief-Justice Earl, of the English bench: "The law trusts the advocate with a privilege in respect to the liberty of speech which is in practice

extended and even elastic privileges. But this must maintain, that, even before he reaches the imposed limit which bars him from aspersing the character of a witness, he trench on dangerous ground, as, for instance, when, in address to the jury, he so misstates or distorts the medical evidence as to make it appear other than what it is. Examples of such unfairness have fallen within the experience of many medical men who have appeared in the capacity of witnesses. They are far from being excusable on the ground that the lawyer is not bound by the oath of the witness to speak the truth because his relations to his client neither absolve him from a higher law nor from respect to healthy public opinion. It is a further remark that the heat engendered by a closely-contested case may palliate, if it does not excuse, the faults of the conduct now under consideration, but there is no such apology for the conduct of judges who allow scientific testimony to be grossly handled. They seem prone to forget that the effect of "brow-beating," to which medical witnesses have to submit, often defeats the very object of judicial investigation. A view may be supplemented by some remarks on the difficulties natural to the position of the medical witness, which are well put in Paris and Fonblanque's "Medical Jurisprudence" that I shall not apologize for giving them in their own words. "A scientific witness fully acquainted with the subject in dispute, and by particular knowledge well qualified to instruct the court on the most important points, is too frequently

nicalities for which he is unprepared with any defence. . . . We do not mean to arraign the present forms of examination in general when we assert that some abuse in practice too frequently places the medical witness in as painful a situation as if he were himself a criminal." I, on the contrary, believe that the "present forms of examination" may very justly be arraigned, and that they are susceptible of improvement. Now, let me hasten to state my conviction that the number of lawyers who abuse their privilege is few as compared with the many who do not. I have entered my protest against the length to which some go, and all, perhaps, think they have a right to go; but, this much being said in the kindest spirit to my legal friends, I wish some lawyer would arise in this assembly and point out the deficiencies in the conduct of medical men viewed from the stand-point of his profession. I will now add my belief that medical witnesses are treated, as a rule, with high consideration by counsel, and that, very properly, the more important and influential they are the greater the deference paid to them. This, I repeat, is very proper, but I must beg them to keep a corner in their hearts—a cynic might say a corner in their pockets, it being a popular error that lawyers have no hearts—for the humbler, though perhaps equally worthy, members of my profession. There is, let me say, a tendency to pay exclusive deference to those whose reputations have impressed us with feelings of respect and reverence. We often pride ourselves on a sort of intimacy with people whose names are spoken with admiration in the public places, though we may have had no personal intercourse with them. We are all, indeed, lawyers as well as others, prone to undue reverence for authority. And so it happens that exclusive and, I had almost said, obsequious deference is paid to Professor A or B because they are the major lights of our profession; so much so, that if a scientific man who has his light under a bushel, but who also may be just as competent, is induced to confront the opinions of these others, we are tempted to conceive a contempt of his mental calibre and regard him as one of the too numerous conceited individuals who "rush in where angels fear to tread." Well, who will then that counsel is exempt from this same failing; and does

it not explain why medical witnesses who; though able and learned, may not have had their talents trumpeted abroad, meet sometimes so little consideration at their hands? This is a petty grievance to be sure, but it deserves a remedy, and this I think is to be found in more intimate intercourse between the members of the two professions. For, lawyers and physicians cannot long associate together without great mutual benefit, and without discovering much latent ability requiring only the stimulus of contact to be quickened into life. But intercourse should not be confined to these meetings. The leading members of this association would confer no small boon on both professions by encouraging that social communion among them which is the cement of all good understanding and friendship. The benefits of such an intercourse, full, free, and untrammelled by the forms of our society reunions, would flow out on all sides, increasing the amenities of life, and otherwise contributing to the general benefit.

The medical witness is entitled to have questions put to him in a clear, intelligible form. The unintelligibility of many of these is a subject of surprise and comment among medical men. They complain that they often betray such a want of precision that the medical witness is puzzled how to make sense out of them. The reason seems to me obvious enough. It is almost as difficult to put a sensible and precise question as to frame a guarded answer. Both acts require an intimate knowledge of the subject on which the examination is to be conducted, based on a systematic preliminary training in its elementary principles. It is not reasonable to expect that men, however intellectual and studious, can supply deficiencies in this respect by a few weeks', or even months', cramming for a trial. Indeed, the real wonder is that counsel succeed so well, considering all the disadvantages under which they labor. In pointing out these things to our legal friends I am quite sure we have no intention of assuming airs in their presence. Such pretension would indeed be very absurd, for there are points of culture in which the advantage is conspicuously on the side of the legal profession. I might instance the faculties of argument and expression—of dialectic, in a word—arts in which medical men are usually deficient, but which are the

y qualifications of the lawyer. Various remedies are suggested for this defect of questioning, the most of which I will, however, reserve for a future part paper. But for the present I will mention, as a good reform, the employment of medical men to assist in the medical parts of lawyers' briefs.

It is right to use memoranda, conceded to all witnesses, is very necessary to medical men, whose investigations are often of a nature too complex to be accurately reproducible without them. It is one of the wonders about the human mental constitution that impressions, fading in the face of engrossing occupations, are so quickly resuscitated by special aids. One of the most effectual of these is a written document, which, though not received by courts as evidence for memory, is permitted as an aid to recall the past. It is immaterial whether the memoranda are made by the witness himself or to his dictation, by an assistant, provided taken at or soon after the investigation, for with each passing day's delay their reliability is more and more weakened. In drawing up memoranda we cannot be too exact in adhering to facts and dates. These require to be recorded with scrupulous accuracy. As regards facts they should be cautiously set down as they appear; and too many precautions cannot be taken against the besetting error of mixing facts with inferences. The golden rule would seem to be to state the facts first and the inferences last; to state the facts first and the inferences cautiously.

IV.

Obligations of the medical expert, which I will next consider, are divisible under three chief heads: 1. His obligations to courts of law; 2. To medical science; 3. To his fellow medical brethren. The last of these will form a heading for general observations on the duties of medical men in the course of their profession who are defendants in suits for malpractice. The three will be considered in the order now

1. Obligations to Courts of Law.—In many cases regarding investigation the coroner's court is the first before

which a medical witness is summoned. The laws of this State "make it the duty of coroners to summon a medical witness," to be present at inquests. "And it shall be the duty of every coroner to cause some surgeon or physician to be subpoenaed as a witness upon the taking such inquest," says the statute (vol. iii., p. 1036, *Revised Statutes of New York*). It declares that physicians so summoned shall be liable to the same penalties if they refuse to attend as are provided in other courts, and yet, by an extraordinary omission, it affirms nothing in regard to their compensation. Now, though it may be a little out of place, I must observe that, for consistency's sake alone, their labor should be compensated here as in other courts. The character of the service is precisely the same. That its remuneration should be a recognized thing in one and not in the other court is, to say the least, evidence of a very unsatisfactory state of the law on the subject. A more just and rational provision is made in the British possessions, though by no means an adequate one. But, at all events, it has the merit of greater consistency. There medical witnesses receive from town or county a fee of five dollars for expert testimony given before a coroner's court, and ten dollars if required to make a *post-mortem* examination. I fear time will not permit me to enter into details regarding the physician's duties at coroners' inquests. I must content myself with referring to Taylor's and Beck's manuals for most that is required to be known on the subject. Suffice it to remark here that he should be very circumspect of the opinion he gives at the inquest, both on account of its paramount influence with the coroner's jury, who look to it sometimes for sole direction, and of the severe criticism it must undergo in the higher courts.

The question, whether a medical man can be compelled to appear in court as a skilled witness against his will, comes next in this section. The general opinion is in the affirmative, though, as we shall see, there is not unanimity among the judicial decisions on the subject. I speak of skilled witnesses, because only in reference to such has any doubt existed, all citizens being obliged to give evidence in courts of law as ordinary witnesses. The usual mode of summons is by subpoena, which is a positive command obliging obedience under pain of certain speci-

alties. It was indeed held at one time that this compels binding on ordinary witnesses only; that medical being, as it were, extraordinary witnesses, could not be compelled to attend court against their will. In fact, was the opinion of Lord Campbell in *Betts vs. Warwick Assizes* (quoted in Taylor's "Medical Jurisprudence"). He held that "a scientific witness was not bound upon being served with a subpoena, and he ought not to be subpoenaed. If the witness knew any question of fact to be compelled to attend, but could not be compelled to attend to speak to matters of opinion." Prof. Max, in a foot-note to his able work on the "Jurisprudence of Medicine," suggests that Lord Campbell's language must have been accurately reported, because, "in the law, it has never been admitted to be within the discretion of any person to disobey the subpoena of a court within its jurisdiction he may chance to be. . . . In the second place, if told the purpose of his examination, he can exercise his choice in the matter of his attendance, unless he could show that he was neither a competent or ordinary witness, nor a doctor; but, as he can never know this absolutely in advance, he is certainly made his duty to obey the subpoena." And this is not merely the most likely but the only logical conclusion of the matter, being also what our law-courts would assent to, yet I find the old opinion reaffirmed by Justice Sprague, of the United States District Court. The case was as to the right of said court to compel the attendance of an interpreter who had disobeyed a subpoena. After stating that on a former occasion he had refused "to issue a writ of arrest in such cases," he proceeded to say: "When a person has knowledge of any fact pertinent to an issue to be tried, he may be compelled to attend as a witness. In this case, upon equal ground. But to compel a person to attend merely because he is accomplished in a particular science, profession, or occupation, would subject the individual to be called as a witness in every case in which any question in his department of knowledge is to be solved."—(In re Kœlker, 1 Sprague Dec., 1884, Appendix to Elwell's "Malpractice and Medical Evidence.")

Thus unsettled stands the question. We may say of

the controversy upon this question what Curran remarked about an indefinite speech, that "it begins at a point and goes on widening and widening until it fairly puts the question out altogether." In this as in other circumstances, however, we will find prudence the better part of valor. It will be at least expedient for us to obey the summons, even though issued by so indulgent a Judge as Mr. Justice Sprague.

2. *His Obligations to Medical Science.*—The medical expert in a court of law occupies the distinguished and responsible position of representative and exponent of the most advanced ideas and most recent improvements in medical knowledge. It is hence requisite that he be well learned not only in the fundamental branches of medical science, but also in the latest researches and most improved methods of investigation. This proposition is so obvious and reasonable that the bare statement of it should suffice. But something further is requisite to constitute what is, in the broad sense of the term, a good witness, and a fit representative of the medical science of the day. If this knowledge is to be made effectual it must be assisted by two important acquisitions, namely, by powers of observation and by faculties of reasoning correctly on the facts observed. To these must be added an amount of practical experience sufficient to enable him to bring this knowledge to bear on the points under investigation. According to the degree of proficiency in these things will the reputation and usefulness of the medical witness be affected for good or evil, and hence they deserve to be seriously considered.

Medical men—in matters relating to the sick, such quick observers—are, when summoned to act in an unusual capacity, like people generally, liable to overlook valuable facts. This defect, of which we are all more or less conscious, is partly occasioned, I think, by undue concentration of the mental faculties upon purely professional subjects. The mind absorbed in this one pursuit is not free to receive new impressions; or it becomes imprisoned in its own conceits, and a narrow, pedantic character is the result. Part of the defect is also due to neglect of discipline and self-culture. But by far the greatest portion is the result, I feel convinced, of the edu-

l system pursued in our medical schools. With the effects of that system, as a whole, I have not now to do. marks which I am about to make relate immediately to partment of it called medical jurisprudence. Still, let , on the general question, that I am wholly in accord ose medical reformers who urge upon our attention the ges of giving this system much more of a practical er. I think they are entitled to our gratitude for point- its incompetency to fit medical men for the ever-widen- le of duties imposed upon them by the exigencies of society. If we were to judge by the system they so ondemn, we would be forced to believe that physicians geons have no other duties apart from writing prescrip- id setting broken bones, for it unaccountably neglects ential practical instruction which they should have as ary preparation for the important functions they may d upon to discharge to the State in view of an exacting ical public. As a particular instance of this defect, point to the practice of confining tuition in medical dence to dry theoretical disquisitions, given at the fag- a curriculum, and offered as a substitute for that prac- struction which is of far greater value. How nearly these lectures are the experience of every student who n schooled in the art of acquiring knowledge under ies will tell him. I do not think I exaggerate the de- this kind of instruction, when I say that, of the num- aspiring young men annually turned out by our medi- ges, ninety-five per cent. have no practical knowledge medicine ; hardly one, if brought face to face with an tal death or wounding, would know how to apply the theoretical knowledge he has received from his lec- id his text-book ; hardly one would make a respectable of what he does know if asked to perform an autopsy a statement to a coroner's jury.

pride ourselves, and to a certain extent justly, on the ity of our institutions of learning ; but in all that re- the practical application of skill, and particularly l skill, to the service of the State, we are, I really be- ur behind what some of us might choose to call "the

effete monarchies" of Europe. Let me instance, as an example of what we might profitably imitate, the school of legal medicine attached to the University of Berlin, wherein each student who desires receives practical instruction in medical jurisprudence, enjoying opportunities of examining the living, of making autopsies, of analyzing poisons, of essaying the right methods of applying various tests, such as those required to ascertain the modes of death of infants—in a word, of putting to practical use the discourses heard in the lecture-room. The Austrian system, if I am correctly informed, is, or was equally good, and the French, though deteriorated within the last fifty years, and now much more defective than need be, is still better than any either England or America can lay claim to. Many stanch supporters of the constitutional freedom and institutions of Britain have deplored her deficiencies in this respect. Dr. Gordon Smith, for example, in the course of his work entitled the "Analysis of Medical Evidence," earnestly insists on the necessity for a law demanding more special qualifications for medical witnesses, accompanying, however, his recommendations with a pardonable strain of national glorification. "Though," he writes, "one of the last of his countrymen who would wish to see the customs and institutions of Great Britain shaped according to foreign patterns, we might take a hint from and improve upon their practice." Truly, and we also in America, overlooking this appeal to national prejudices, may take a hint from, and, at least, *try* to "improve upon, their practice." That there is ample room for improvement is evident from this one fact, that we are to this day nearly as deficient as the English were three-fourths of a century ago, when even John Hunter had to deplore to his class his want of sufficient medico-legal training, accusing himself of incompetency at the trial of Sir Theodosius Boughton. It is mere folly to expect that, because a youth has gone successfully through the ordinary medical curriculum, he will be fitted to discharge the important duties of a witness in a court of law. For, though his professional learning is essential to him here as elsewhere, yet the demands of the position are so exceptional—have so much to do with applied science and a knowledge of circumstances which do not occur in his routine

ence—that a training over and above what is purely legal is necessary to him. I will venture to assert as much for the legal profession, for I think that, had they the advantage of this practical education, we would hear at least fewer complaints from medical men respecting their defective method of training medical experts. But, to be valuable, the education must be unmistakably practical or experimental. Among those who see and lament the great defects of our present medico-legal tuition, the impression prevails that its proper remedy will be found in the more universal establishment of chairs of medical jurisprudence in our medical colleges. Now, this proposition is undoubtedly good, though it cannot be contended that such chairs are of great value and worthy esteem, I will not allow that they are the sole and adequate remedy for the evil complained of. I believe nothing will do short of a real, practical school of legal medicine, where the medico-legal issues of the day, with its morgue, its pathology, its appliances, its medical and law libraries, its means to teach the fundamental branches of medicine, enable lawyers to expound the elementary principles of jurisprudence. We know how valuable such a course of instruction would be to ourselves; and if, as Sir Edward Coke has said, "Some knowledge of every science and art is not only useful but even necessary" to lawyers, we can estimate the great service it would be to them. Consider, again, the effect of such a school of legal medicine in the instruction of public functionaries such as coroners, and in fitting them for the duties of their important office. No reasonable man can deny the advantages which would accrue to the whole community if all candidates for the coronership were required to have a good grounding in the essential principles of law and medicine. It is a conviction with many whose judgments are held in great respect, that coroners should be medical men; striking things in the chaotic shape in which we find them, ought to be no doubt about the truth and propriety of this assertion. Certainly, in the present total absence of instruction for laymen in the important duties of the coroner's office, medical men are the only persons at all competent to fill the position. Under our present system—if system it is

worthy of being called—coroners do not understand their duties, and consequently they do not fulfil them. This is no novel complaint, for, though seldom spoken openly or where it can awaken serious thoughts among the masses, it is often repeated from mouth to mouth. Still it has been publicly ventilated. Among others I may mention Dr. Semmes as having called attention to it in a report to the American Medical Association, pointing out the slovenly manner in which inquests are conducted in the United States; charging that they are hastily gone through, incomplete and valueless, and that the action of juries in loosely inspecting the dead is “scarcely a formal compliance with the law.” Dr. Beck also, in his work on medical jurisprudence, declares, “That the duties of this office are imperfectly understood, and often most negligently performed, hardly admits of a doubt. The individuals appointed are frequently unfit for the situation, both from habit and education, while the jury are too commonly desirous of hurrying through the investigation.”

It is not to be supposed that the scheme of education here advocated would cure all the evils of our coroners’ courts, of which there is so much complaint, for many are no doubt the result of abuses which slowly adhere to all institutions, as barnacles gather round the good ship’s bottom; but it would remedy some of the most flagrant of them, and contribute largely toward increasing the efficiency of this branch of our criminal service.

The necessity of this special training being conceded, there are other qualifications necessary to medical experts, concerning which a few words may be spoken. There are two minor distinctions among medical men considered as possible expert witnesses, one based on acquired, the other on innate qualities. The first is the full result of the special education we have just been considering; the last comes from the possession of distinctive natural powers. This insures a well-conducted witness, that one who is well informed. It is difficult to define what the innate peculiarities are, but they help to make much of the difference between even well-instructed medical men, when they appear on the witness-stand; for, I may remark in passing, not all even well-versed medical men pass successfully

the forms of an examination in this place. It is one thing to be a sound practitioner, and quite another to be a medical expert witness, because the kind of knowledge necessary for a good witness is special over and above what is required for a good practitioner. These innate or natural peculiarities are due to temperament and habit of mental discipline. The temperament of some men is such that, despite accurate observation, they are failures on the witness-stand by reason of unconquerable nervousness the moment they encounter a cross-examination. Others lack the logical faculty for making proper inferences from facts, and again others lose their train of mind altogether.

In all that I have now stated on this important branch of the subject it may be inferred that the following qualities are necessary in a good medical witness, namely, a thorough medical training, the logical faculty, and a well-balanced temperament.

A medical witness thus equipped has various important things to perform. The questions on which he is called to testify "are vast and unlimited in their range, and many are soundless in their depth." He owes it to the cause above all else to thoroughly inform himself on all facts of the case submitted to him. This means that he must avail himself of all the steps for arriving at the truth. These means are will depend on the nature of the inquiry, and of great importance to the interests committed to him. Before using them, he should have divested his mind of preconceptions respecting the merits or complexion of the case submitted to him. This is avowedly difficult, for the following reasons: First, the prevailing practice of the daily press is to prejudge the merits of cases, and who, wittingly or unwittingly, pervade the public mind with a bias derived from reading their opinions. When a case of unusual interest comes before the journals take sides, and fight over again, with a profusion of ink, mimic wars of the Guelphs and Ghibelins. Medical men are just as liable to be influenced by what is said in these journals as other people, and it will therefore be out of place to caution those who are employed as experts to forego the discussion until the trial is over, or

they have examined the facts on which their evidence is to be based.

Second, the habit of hasty inference so common even among well-instructed members of the community. It is often verified by observation that those who jump to hasty conclusions are generally most blindly obstinate in adhering to them, either from inherent narrowness of mind, or from aversion to acknowledge an error of judgment. I need not indicate how much all this is incompatible with the duties of a medical expert. We all feel it to be of the last importance that every medico-legal case should be approached with minds free from prejudgments, that it should be allowed to stamp its own impress upon us, that the facts should be observed and examined in their true light; for these are the crude ore out of which subsequent thought and study must produce the pure coin of expert opinion fit to pass current in a court of law. In this stage of the inquiry the expert can follow no better guide than the following general rules taught by Descartes in his "Discourse on the Right Method of conducting the Reason:"

1. "Never to accept any thing for true which you do not clearly know to be such; that is to say, carefully avoid precipitancy and prejudice, and comprise nothing more in your judgment than what is presented to your mind so clearly and distinctly as to exclude all ground of doubt.

2. "Divide each of the difficulties under examination into as many parts as possible, and as might be necessary for its adequate solution.

3. "Conduct your thoughts in such order that, by commencing with objects the simplest and easiest to know, you may ascend by little and little, and, as it were, step by step, to the knowledge of the more complex; assigning in thought a certain order even to those objects which, in their own nature, do not stand in a relation of antecedent and sequence."

Lastly, in every case make enumerations so complete, and reviews so general, that you may be assured that nothing was omitted. The delivery of an opinion is the proper function of a medical expert in a court of law. Yet he is not allowed to be judge of the facts on which his opinion is asked. If a sick man came into your office and stated to you a number of

symptoms which he alleged to be facts, but at the same time debarred you from verifying by the proper methods of investigation, requiring you to base on them an opinion as to the nature of his disease, your dilemma would be of the same species as that of the medical expert in a court of law, with the sole chief exception that in the court all witnesses are under the obligation of an oath. I think I know what course you would take in the case of the office consultation. You would refuse to base an opinion or prescribe a course of treatment on facts, the truth of which you were not permitted to judge for yourself. Yet this is just what a court of law will not allow the expert. He must take facts as they are stated to him. "For him to pronounce an opinion," says Prof. Ordonaux, "either upon the truth of the facts given him for interpretation, or upon the merits of the case, would be to usurp the province of court, advocate, and witness." And the same authority further states that this rule is not adopted with the intention of diminishing the value of medical evidence, but to prevent experts from usurping a power "which they might be tempted to use for the benefit solely of the party calling them." This last expression in reference to the tendency of expert witnesses—a tendency by no means, however, peculiar to them—to assume a partisan attitude, leads me to the point which I argued in a paper I had the honor to read at this Society a year ago. On that occasion, when treating of expert-evidence in criminal trials involving the plea of insanity, I dwelt at some length on the same question, and pointed out that this tendency was in great measure due to the prevailing, and, as I think, defective custom of calling such witnesses. I suggested as the proper remedy that the court alone should call and examine the medical experts, a suggestion which I am pleased to find sustained by the weighty authority of Prof. Ordonaux, although I must, at the same time, say he throws doubt on its practicability. "It would be better," he writes, "were it possible, for the court alone to examine experts upon those points on which their professional opinions are needed, rather than to hand them over to counsel, each of whom has an interest in making their testimony aid his own side, and to that extent forcibly impressing upon it a uni-

lateral character" ("Jurisprudence of Medicine," p. 123). It is very proper to say to the medical expert, You must come to the discharge of your duty with a mind nearly if not absolutely free from prejudice; you must allow neither interest, nor pride, nor jealousy, nor party-feeling, to influence you; you must stand on neutral ground, neither leaning to one side nor to the other, and deliver your opinion, whatever it may be, solely on the merits of the facts, wholly irrespective of its consequences. No one will question the propriety of this advice, but few can help knowing how much it sounds like a mockery. Because he should his mind escape the bias to which it is exposed, for the causes already stated, before he gets to court, and should succeed in coming on the witness-stand without prepossession in favor of one side or other, the fact of his being called to the stand for one party, taken with the efforts of counsel to lead or force him in a desired direction, must unavoidably get him into the very trap he is so loudly warned to avoid. And the very testimony which we are told must be delivered in the interest of no other cause but truth—how is it handled by the opposing counsel? Does he respect its neutrality? Does he not rather try with all his might of dialectic to bend it to the cause for which he contends, or, failing here, does he not beat it down and belittle it in the opinion of the jury? What, then, is the fate of your independent medical expert? Does he fare any better than if he were a partisan? Is he not, like Issachar, crouching down between two burdens? Of two things one is true: either the present mode of examining experts is wholly faulty, or all the talk about the necessity of lofty dignity and absolute impartiality is "sound, and nothing else." No matter whatever may be thought of the practice of our courts in this respect, we must all heartily wish that such noble sentiments will always actuate and guide the medical expert. Appreciating, as I have no doubt we do, the contradictory requirements of the situation, we know that it would be a much greater public misfortune should medical witnesses abandon these lofty principles, than that the impartial spirit of medical testimony should be outraged by partisan zeal. And, until change is made which will give the court the sole right of

examining the medical witness, we must e'en bear with what equanimity we can.

In the formation of opinion it is well to be on guard against the misleading effect of certain fallacies. In the preparation of an opinion we are liable to fallacies of inspection, or *a priori* fallacies, by which are meant those consequent on forming an opinion hastily and without seeking sufficient evidence of its truth. I will take as an example of this kind of fallacy a statement from the testimony of a celebrated surgeon of this city made at the trial of Walsh *vs.* Sayre. Being called, this surgeon testified that he had examined the child, Margaret Walsh, more particularly her hip joint, i. e., "the aspect of the hip called the gluteal region." The examination proceeded as follows:

Q Well, did you examine any discharge of fluid that was from the orifice; was your attention attracted by

A Yes, my attention was attracted by a discharge coming from the orifice.

Q Was your attention attracted to the particular character of the discharge?

A Yes.

Q Well, what was it, to the best of your recollection?

A It was a glairy fluid, slightly colored.

Q Need hardly ask you the question—you are acquainted with the character of synovial fluid, the character and appearance of the fluid?

A Yes.

Q In your judgment, did you find any synovial fluid discharged from that orifice?

A It struck me so that it was.

Q Did you examine it at all?

A Yes, I examined it with my fingers, and looked at its general color, etc.

Q Was that the opinion you formed at the time, as well as now?

A Yes.

Q Did you state that opinion at the time?

A Yes, I think it is very likely I did.—(*Alleged Malpractice*)

Suit of Walsh vs. Sayre, p. 134. Shaw & Co., New York (1870.)

The hasty impression snatched from the two facts—the hole in the gluteal region, and the “glairy fluid, slightly colored” issuing therefrom—was unadvisedly delivered as an opinion, or delivered as an opinion without necessary confirmation from further evidence. This is one of the fallacies of observation named non-observation, or the omission of facts which are material to the inquiry. It partakes also of the nature of mal-observation, which is the confounding of “a perception with a rapid inference, or the mingling up of inference with facts” (Bain’s *Logic*, vol. i., p. 37). Great caution should always be exercised in the formation of an opinion. This is a lesson not easy to learn. The sanguine, hasty disposition is naturally liable to overleap the details which to the wary are the necessary steps to a conclusion. Hasty inference and hasty action are by no means infrequent, owing to a hurried, slovenly way of thinking, impatient of the work on which an opinion entitled to consideration must be based.

The proper method of forming an opinion falls under that part of logic called analysis and synthesis. It comprehends the details to which I have alluded, and some more, of which the habit of abstraction is one of the most useful. By abstraction is meant the separation and separate consideration of the qualities of a body or the terms of a proposition. It is a habit of great value in preventing confusion of thought, and in enabling the mind “to concentrate its powers on the one subject of study at the time” (Bain’s *Logic*, vol. i., pp. 338, 339). Of equal importance to the witness is the “analyzing function of the syllogism.” This is the happy faculty of making explicit in the statement what is implied in the thought (Hamilton’s *Logic*), the use of which, in the language of Mr. Mill, “to make us aware when something that claims to be a single proposition really consists of several, which, not being involved in one another, require to be separated, and to be considered each by itself, before we admit the compound assertion” (Mill’s *Logic*).

Finally, all who are asked to express a deliberate opinion may profit by calling to mind the very pregnant remark

Plato, that "opinion is at its best but a mean between knowledge and ignorance."

Before quitting this part of the subject, allow me to make a few observations on the differences between legal and medical definitions of diseases and injuries. Necessarily these definitions are dissimilar, owing to the different objects or intentions contemplated by law and medicine respectively; the object or intention of law being to settle the bearing of these states on life, liberty, and property, while that of medicine is to facilitate diagnosis, classification, and treatment. As an example let us take the term *wounds*. In medical science a wound is "a solution of continuity of the skin occasioned by external violence;" in law it means "any lesion of the body, whether cuts, bruises, contusions, fractures, dislocations, or burns" (Wharton's *Law Lexicon*). In surgical works wounds are classified as incised, contused, and lacerated. But legal authorities divide them into "slight, dangerous, and mortal," terms which are obviously here used in their relation to the possible or probable contingencies of deformity or death. Thus a slight wound, in the legal meaning, is one neither dangerous to life nor likely to leave a deformity; a dangerous wound may do either, and a mortal wound is one fatal to life. This distinction is of importance to the medical expert, for, in delivering an opinion on the nature of a wound, he should be prepared to meet the legal as well as the medical requirements of the interrogatory. This is a circumstance which gives un doubted advantage to the cross-examiner, and affords him an opportunity of puzzling the medical witness. In their mode of putting such questions, however, counsel often display a happy unconsciousness of the difficulty and even impossibility of answering them, though they demand a direct and positive answer. It seems to be a prevailing impression with them that the site alone of the wound governs its mortality; that all wounds of the head, or chest, for instance, are mortal. The question is often put thus: "Are wounds of the head mortal? answer me, yes or no." Now, it is evident to the merest tyro in medicine that no such answer can be given, because the mortality of a wound depends on other circumstances than its mere site, namely, on its character, extent, depth, and on its

involving vital parts. But, I fancy I hear a disputation lawyer exclaim, "What! is not the head a vital part? You are surely talking nonsense." Well, here is the answer. The integrity of a man's scalp is not necessary to his life, as my outraged legal friend may discover for himself by trailing the tail of his coat on the Plains. But, to scalp a man is certainly to wound his head; therefore all wounds of the head are not mortal. Some are, others are not; anyway, it is impossible to give the answer demanded by the question just cited.

The same difficulty presents itself in many of the questions put about diseased states. A medical expert is sometimes asked to define insanity. Now, to define a disease is to select some essential character which will be true of it in all its varying phases and circumstances. If insanity presented any such constant condition, a definition could certainly be framed which would stand for the abstract notion of it. The modified states of these characters found in various phases of insanity would stand for definitions of these phases. But a definition of insanity is impossible because it presents no such condition. The truth is, however, that definition and description are often improperly used synonymously. When a medical witness is asked to define insanity, the intention is to have him describe it, and then the proper return question of the medical expert is, What kind of insanity do you wish described? While on this subject I may remark that there is a strange diversity of opinion among legal men as to the practical value of expert testimony in trials involving the question of insanity. According to some, the courts are chiefly guided by medical experts; according to others, expert evidence instead of elucidating the subject only involves it in greater mystery. An English judge is reported to have expressed himself as follows on the subject: "His experience taught him that there were very few cases of insanity in which any good came from the examination of medical men. Their evidence sometimes adorned a case, and gave rise to very agreeable and interesting scientific discussions; but, after all, it had little or weight with the jury." It is also complained that, in some trials the medical evidence is too freely dashed with metaphysics. Now, with respect to the first of these charges, I may remark

al men seem altogether to lose sight of the important legal ideas about insanity are formulated, or at least ped, which the medical are not nor can be. Medical are undergoing progressive modifications to admit new ice of the nature and bearings of this disease. And, pect to the second, I must in candor say that, granting ctness, the mistake it complains of is often chargeable resetting tendency of courts of law to drift into a sea physical discussion, and to pay undue attention to the cal side of questions of insanity. We may trace this through the deprecatory remarks of the English judge ted, especially where he states that the evidence of ex- insanity "sometimes adorned a case, and gave rise to resting scientific discussions." These words exactly t the weakness to which men of education are prone ey catch a scientist. They look upon him as a *rara* th which they are glad to attempt a few intellectual y way of innocent diversion. The trial is, in a meas- ended that the court may enjoy the luxury of "an ng scientific discussion." During this interlude the rest from the fatigues of a hotly-contested combat, the w a long breath of relief, the judge leans calmly back hair, a pleasing, drowsy lull steals over the wearied nd, in the general suspense, all eyes turn with pleasing tion to the rising luminary. When the *séance* is ended, eshed court applies itself with new vigor to the knotty t of the hour.

ging by incidents frequently occurring all over the , the plea of insanity would seem to be one of the *cherché* morsels which it is possible for a lawyer to en- ertainly they have far transcended the zeal of the medi- ssion in their efforts for the extension of its boundaries. as attracted their special favor is the plea of moral in- a vague disorder, whose outlines are yet indistinct if dowy. Nevertheless, the legal profession experience ulty in detecting it in almost every man whose crime tartling character. Is a man clutched by the law after successful villany, or does he commit a murder under erving influence of passions pampered for years, or is

he a bigamist, he will find counsel ready to establish his insanity. And so it goes on until, finally, insane impulse will be the accepted cloak for crime, and the little moral resentment or indignation against wrong-doing that survives will die out from among this indifferent, self-seeking generation.

There is danger lest the medical profession become inoculated with the loose, *dilettanti* notions of the day on this subject, and so be swept away with the popular current. It is a failing with educated men that they often give indiscreet adhesion to new-fangled notions. The ignorant do not; their want of intellectual unrest or earnestness leaving them to hug the old and traditional. But lovers of progress have this weakness, that, like the Athenians of old, they are ever running after something new. No doubt the temptation to overdo the plea is very great both for lawyers and physicians—for lawyers, because insanity is a plausible, an imposing defence; for physicians, because the study is truly captivating, both in itself and by reason of its close affiliation to metaphysics—in turn, a branch of learning dear to many of the most gifted sons of men. But beware of hobbies, for the time may come when the use of the plea will be confounded with its abuse, and both condemned together.

Finally, I will briefly consider some of the duties of medical men to each other, as witnesses and otherwise in trials for malpractice. Allow me to introduce the subject by a hurried sketch of the legal nature of the business relation between physician and patient.

Prof. Ordronaux, in the able work I have already many times quoted, and for reference to which I am indebted to the kindness of the President, states that "the character of a professional service is that of a mandate, and the obligations incurred under it, when no special contract has been entered into by the parties, belong to that class termed in the civil law *quasi ex contractu*." In Wharton's Lexicon, a mandate is defined to be "a judicial command, charge, or commission," having as necessary qualities, 1. Some object of the contract, i. e., "some act or business to be done;" 2. That this act or business should "be to be done gratuitously;" 3. That the contract should be voluntary. Certain obligations were cre-

ated on both sides by the mandate; on the side of the professional (mandatory): 1. "An obligation to do the act; 2. To do it diligently; 3. To render an account of his doings to the mandator. On the part of the mandator to reimburse the mandatory for all expenses and charges incurred in the execution of the mandate." I will pass over any further allusion to the mandatory character of the service, and merely content myself with calling your attention to what seems to be an error in the classification of the obligation—Prof. Ordonaux and Mr. Wharton placing it among *quasi* contracts, which they state to be implied contracts, while Mr. Main, at p. 332 of his celebrated work on *Ancient Law*, declares this to be an error: "For," he writes, "implied contracts are true contracts, which *quasi* contracts are not." The question may seem to have only a speculative or historical interest, but in reality it is more, because if the relation between physician and patient be that of *quasi* contract only, which according to the highest authority of the day means no contract at all, it can have no definite legal obligations. If there be really the distinction between the terms as pointed out by Mr. Main, I could prefer classifying professional contracts under the heading predicated by the word implied. And it is easy to trace the early history of medicine, in Rome, the origin of this relation between physician and patient. The well-to-do class of the Roman people entertain a strong aversion to the physicians of their day who practised for money, as shown, among other evidences, by Cato's rudeness to the Greek physicians practising in the city, and his urgent admonitions to his son to avoid them and the study of their art. Actuated by this aversion, which was mainly born of distrust, they discarded the services of qualified men, and relied chiefly on prescriptions contained in such books as the *Commentarius*, or on the empirical skill of trustworthy slaves or freedmen. Now, as, by Roman law, slaves and freedmen (when these latter were not citizens) were excluded from all civil rights, being "only object and liable to duties" (Austin's "Jurisprudence," vol. i. p. 741), they were debarred from entering into contracts, though they would doubtless always receive an *honorarium* for their services in so important a matter as the preservation of

health. And, from always receiving the *honorarium*, they would come at last to have an implied right to it; thus the service being done, the *honorarium* would follow as its implied condition. The idea of the implied obligation of professional services passed into English common law—which we know to be chiefly derived from Roman civil law first filtered through canon law—and has lasted there even to the present time, two thousand and more years after the circumstances originating it have ceased to possess a living meaning. And to this day no member of the Royal College of Physicians can sue for his fees. But, in our country, this, like many more of the lifeless traditions of the past, has never been resuscitated. “Whatever,” said Chancellor Walworth, “may be the practice of other countries . . . the principle never has been adopted in this State, that the professions of physicians and counsellors are merely honorary, and that they are not of right entitled to demand and receive a fair compensation for their services.”—(Quoted from Ordonaux’s “Jurisprudence of Medicine,” p. 39.)

The physician or surgeon who undertakes the treatment of a diseased person has the following duties to fulfil: 1. He shall exercise *ordinary* skill and diligence; 2. He shall devote *ordinary* care and attention. You will remark the recurrence of the expletive “ordinary” in both of these injunctions. It gives an important interpretation to the meaning of the law. It is plain from the language of commentators that the meaning is not common, *unlearned* skill, but ordinary *professional* skill—namely, that average skill which results from having the necessary degree of professional knowledge. And again, it does not mean the ordinary skill of the great lights of the medical art, but that which is displayed in the practice and deemed necessary in the judgment of medical men generally. Such is the meaning of the expression as applied to the general body of the profession; but for specialists, for those who claim a higher degree of knowledge and skill in their department than most other physicians, being employed on that account, and charging higher fees for their services, it has a particular meaning. It then signifies extraordinary skill by comparison with the ordinary skill of the profession, which is equivalent

ry skill as compared with the prevailing standard of
ng specialists.

as skill implies the possession of knowledge, so the
g requirements of the law have reference to the ap-
of this knowledge. It is not alone required that the
should display ordinary skill, he must also use ordi-
and diligence. The term ordinary, as a predicate of
diligence, has the same force here, as when it is used
nce to skill; which is to say, it means that degree of
diligence which is displayed in the practice, and
necessary by the collective judgment of medical prac-

But further, it also means care and diligence pro-
e to the difficulty or danger of the case. It is im-
o bear this last interpretation in mind, as teaching us
courts of law are alive to the fact that severe cases
ne degree of ordinary skill and judgment, mild cases

that what is ordinary skill in some cases is defective
others; that, in a word, the physician is to exercise
e, and diligence, in proportion to the gravity of the
ances of each case. Besides the three qualities just
ed, the medical practitioner is required to use his judg-
to the best means of effecting a cure. We all know
end of medicine and surgery is the cure of diseases
ries, but we sometimes forget that this end may be
by different means, just as two travellers setting out
e starting-point may reach a given city by distinct
fearly every physician and surgeon has experience of
rticular and favorite method of attaining this end.

not necessarily any uniformity among them in this
ior, in the interest of progress, is it desirable there
e. A return to the prohibitory laws of Egypt, which
r practitioners to conform to the stereotyped rules written
oks of Manetho under penalty of capital punishment,
e a movement too reactionary for even the most con-
of the present day. It is merely enjoined on the
ner that he shall use his judgment in selecting proper
r effecting the cure of his patient.

ie time it was held that, if the practitioner escaped an
nt for gross negligence, he could not be judged guilty

of malpractice. But, in reference to this interpretation, Judge Story remarked that there is no legal meaning attached to such an expression as "gross negligence," which could be made good in practice, and that the distinction it is said to denote is "utterly repudiated by the late civil law reports."

I believe there are few, if any, members of the community more conscientious or disinterested in the discharge of their duties than medical practitioners. Liable to be called at any moment to the most complicated case, and expected to be prompt and decided in the application of necessary skill, their movements are suspiciously watched by critical eyes, and their words treasured up, it may be for the day of wrath, by attentive ears. Bearing the whole burden of a great responsibility in a serious case, they must often contend singly against its difficulties incidental as well as natural, sometimes without hope of reward if they succeed, but generally sure of unsparing condemnation if they fail. They who are familiar with this state of facts, and with the obstinacy, perversity, and ignorance, of many to whom the services are rendered, cannot but feel a lively sympathy with the medical practitioner. But, when to this is added the lawsuit entered against him, maybe by the very person whom in his heart he felt he had most befriended—the sting from the serpent he had eased of suffering, or saved from death—his case appeals loudly not only for the moral support of the community, but equally for the material aid of his profession. Putting aside the loud boasters, the selfish, inconsiderate, and even ignorant men to be found in the profession, whose conduct may sometimes deserve the infliction of a lawsuit, I do not hesitate to assert that a very large proportion of actions for malpractice brought against medical practitioners are instigated by unworthy motives. Some, indeed, go further, asserting that were the secret history of such cases known it would unveil the promptings of malevolent professional rivals. This may be true, although I prefer to think not to the extent asserted. I have no doubt many lawsuits are unintentionally originated, or at least encouraged by the indiscreet or inconsiderate judgments which medical men are too much in the habit of passing on the conduct and treatment of their professional *confrères* in presence of lay

people. It is impossible to exercise too much caution in expressing opinions on the character of the professional services of a brother practitioner. Ten chances to one the listeners will misunderstand you, will take your condemnatory words without the qualifications with which you accompany them, will magnify their meaning and add to their substance, until a damaging and irritating grievance is built up against the intended medical victim. The rule of the consulting physician should be *audi alteram partem*, and in all his dealings with men of his own cloth—and of all cloths, for that matter—to exercise more of that charity of which St. Paul speaks as thinking no evil. Besides, simple reflection should remind him how puerile it must be to accept as conclusive the statement of a patient or his friends, ignorant as they must be of the nature of the disease, of the difficulties attending its treatment, and who, in eagerness to establish their case, suppress those facts in their own conduct which would effectually tell against them. Recently I was asked my opinion on the result of treatment a former patient had undergone for a fractured collar-bone. Union had taken place, but the broken ends could be easily felt, and even plainly seen projecting beneath the skin, for they were overriding to the extent of fully an inch. To all appearances this was the most careless or the most ignorant surgery, and seemed, *prima facie*, to justify the threat of damages which he held dangling, like the sword of Damocles, over the head of his medical attendant. But, on sifting the facts, I found the result wholly attributable to himself. It appeared that several times during treatment he became intoxicated, tore the appliances off, and escaped from the control of his medical adviser and friends. Now, if I had inconsiderately given an opinion of this case, if I had condemned its treatment, another might have been added to the long list of vexatious and ruinous suits brought against members of the medical profession.

It is said that nine-tenths of the suits for malpractice are founded on the treatment of fractures, amputations, and dislocations; and the habit of bringing them is increasing so much that honest and capable surgeons have seriously debated the necessity of retiring from a profession whose emoluments are

so scanty in comparison with its risks, and in which the hard-earned reputation of almost a lifetime may be demolished in day. I cannot altogether acquit the legal profession of some share in the production of this feeling of insecurity among medical practitioners. It is their duty, of course, to hear the complaints of their clients, but they should see to it that the complaints are justified by the facts, and they should acquire sufficient knowledge of these facts to enable them to judge whether, even if true, they justify an action which may entail such lamentable results. Have they such knowledge? I fear not. I fear they share to some extent, to too great an extent indeed, the popular error that whatever deformity results from a fracture is the fault of the surgeon. I think they are not sufficiently aware of the differences in the nature and termination of fractures; that, in their nature, they are simple and compound; that simple fractures are transverse or oblique; that *oblique fractures are the rule, transverse fractures the exception*; that the transverse get well without deformity, provided the patient obeys instructions, but that the oblique and compound almost invariably, and in spite of the most admirable surgery, leave shortening or other disfigurement; consequently, that most fractures only unite at the expense of the length or shapeliness of the limb. These, with other facts of a like character, have been established by Prof. Hamilton, of this city, who proved, by the results of investigations conducted in a rare and exemplary spirit of candor and impartiality, that, "in fractures of the tibia and fibula, both compound and simple, perfect results are in the proportion of only one to about three of the cases treated; and, in fractures of the femur and clavicle, complete cure results in about one case in five; in fractures of the patella, a perfect cure happens only in one case in six." Is it not time for the legal profession to have a knowledge of these facts? Is it not a reasonable hope that, with this knowledge in their possession, they will, even apart from moral considerations, lend the weight of their great influence to discountenance ruinous and vexatious conspiracies against medical practitioners?

At the Eleventh Annual Meeting of the Ohio State Medical Society, held in 1856, the question of suits for malpractice

was discussed, and it was asked, "What course shall the profession take in regard to the matter?" "Severe implications," it was said, "are being meted out to our professional brethren on account of imperfections, resident, not in themselves, but in their art." And it was suggested as a remedy, that there should be among the profession a distinct understanding and general consent that brethren going through such suits are entitled to the "sympathy and assistance of as many of their professional" *confrères* "as may be necessary to sustain them," and that "if avoidable, no member of the profession should give his services to the prosecution." I willingly acknowledge the goodness of this advice, but at the same time I must say it has but little force, nor is it applicable to any emergency. It is too vague; it has too much the air of a compromise. Further, it seems to ignore the fact that there are unprincipled, self-seeking men in the hierarchy as well as in the rank and file of the medical profession. So long as this remains a sad truth, which will be as long as human nature is unregenerated, it will be vain to appeal to the "sympathy and assistance of as many professional brethren as may be necessary," etc. There must be some means uncontrolled by sympathy or other transient feeling; some certainty on which the surgeon can rely in that trying hour when he must face round, and fight singly in a cause which is vital to his whole profession. That something is a *professional fund of national extent to which all qualified medical men in the United States should be called upon to contribute*, and which should be used solely for the purpose of defraying the legal expenses of such suits and of paying some at least of the damages inflicted. I cannot enter now into the details of this scheme, though at a future time I may be permitted to do so; suffice it for the present to say that it would be necessary to restrict such aid to those cases only wherein, in the opinion of a medical council duly appointed, it should be proved by careful examination of the evidence that the defendant had suffered unmerited punishment.

ART. II.—*Erotomania*. By R. L. PARSONS, M. D., Resident Physician of the New York City Lunatic Asylum.

CASES of perverted, or exaggerated and uncontrollable sexual desire not infrequently come under the observation of physicians in the ordinary practice of medicine; while physicians especially engaged in the treatment of diseases of the nervous system see the worst forms of what must be considered one of the most degrading and intractable of mental maladies.

The manifestations of this perversion of the sexual feelings are manifold, varying from a chaste and purely emotional expression of love for some real or imaginary object, to the most unbridled and unblushing self-indulgence.

The subjects of the emotional form of this disorder often exhibit no other symptoms of mental alienation. They conduct themselves with the utmost propriety in ordinary matters, are connected in their ideas, rational in their conversation and acts, and exercise over themselves a laudable self-control. Sometimes the amatory passion is for persons whom they have never seen, and even for inanimate objects, and is apparently unconnected with any desire for physical gratification. They constantly talk or think of the object of their love, and are usually self-satisfied and contented from the assurance they feel that their passion is reciprocated. Some are sad or even decidedly melancholic on account of the absence of the supposed object of their affections. In these cases the existence of insane delusion is so manifest that no mistakes are likely to be made in regard to the nature of the malady. Where there is a real and present object the difficulty of the diagnosis is increased, but a careful study of all the concomitant circumstances will rarely fail to place the true nature of the case beyond a doubt. For instance, there may be great disparity of age, great inequality in social position, or obstacles that are evidently insurmountable, such as an existing marriage relation. If in addition to these facts it be known that the object of affection is quite indifferent, or even adverse to the approaches made; or that there have been no demonstrations whatever; and also that the feeling is persistent and quite uninfluenced by the reason or by reasonings; whatever doubts may have existed on a cursory investigation will be dispelled,

may rest assured that we are dealing with a real mania of cerebral disease, and not with a mere exhibition on that lies within the control of the will. A few examples will be adduced in illustration of the class of cases now under consideration :

1. An Irishman, who for some years had been a resident in the State of Iowa, and who had by his industry and frugality succeeded in paying for a quarter-section of land, found his condition of single blessedness undesirable. He took possession of his mind, and occupied all his time with the subject. The longer his mind was occupied with the subject, the higher his aspirations rose, until he found that there was nothing within the circle of his acquaintance that approached the standard of excellence. He now resolved to make a journey to New York in furtherance of what had become an obsession. On his arrival in the city he found employment secured for him in one of the first-class Broadway hotels, and here he discovered the object of his dreams in the person of a lovely and accomplished daughter of the proprietor. Although he had never had a moment's conversation with the lady, nor had she given him the least attention, he immediately fell in love with her, and conceived the idea that she reciprocated his affection. He embraced every opportunity that offered to obtrude himself into her presence, and when he found that his advances were disregarded, overwhelmed her with amatory epistles. Neither the remonstrances of the young lady's father nor her expressions of averting the least influence on his conduct or his belief. He maintained that in reality she loved him, and was only deterred from an avowal of her love by the adverse influence and intimidation of her friends. He was deprived of his liberty, but still continued his persecutions so assiduously as to find it necessary to confine him in an asylum for the insane. While there he still retained his former belief, and only consented to return to his home in Iowa, when he was informed that this was a condition essential to his release. This case will serve to illustrate the simplest form of the disease. The primary cause was probably of a purely mental nature, that is, voluntary absorption in a theme that finally

took entire possession of his mind, so as to subvert his judgment and overpower his will.

In the following case the symptoms of mental alienation are more obvious and the difficulties in the way of a correct diagnosis correspondingly diminished.

A. W. was a wholesale commission-merchant, and had been for a considerable period of time connected with a large business firm in this city. He was held in high esteem by the leading members of the firm, and had been the recipient of valuable presents from them. He became enamoured with the daughter of the principal partner; but his feelings were not reciprocated by the young lady, nor did her father approve of his pretensions. In fact, his advances were repelled, and he was denied access to the house in which the young lady resided. He nevertheless endeavored to gain access to the lady at all hours of the day, and firmly believed not only that she approved his suit, but that the day for their nuptial ceremony was fixed. On account of the persistency of his endeavors to see and communicate with the lady, it was found necessary to put him under the restraints of an asylum. At the time of his admission he was gentlemanly and self-possessed in demeanor, and gave no positive evidence of mental aberration. He stated that the young lady favored his addresses, that they were actually affianced, and that the day was fixed on which they were to be married; and further, that the only obstacle to their union was the unjustifiable opposition of the young lady's friends. All this might have been true. The direct testimony of the young lady herself was not adduced. After admission to the asylum his conduct toward gentlemen was always unexceptional. Toward ladies, however, his bearing was often amorous, inquisitive, and even indelicate. When questioned regarding his supposed intended, he would substantially reiterate the statements at first made. He would say, for instance: "Next week on Thursday she is coming for me, and on that day we shall be married." This same story he would repeat day after day and week after week, whenever reference was made to the subject, without seeming to realize that he had already made the same statement a score of times, and that his statements always proved untrue. He would often

ask for his discharge, but when refused would appear to be quite as well satisfied as though it had been granted. He seemed to be at the same time quite assured and quite indifferent in regard to his future prospects. After a residence of several months at the asylum he forged a pass to the city, by means of which he effected his escape. In a few days, however, he was returned, with a notification that his former importunities had been immediately recommenced. He was subsequently discharged on the solicitation of a friend, who undertook to see that other channels were found for his amatory propensities. No further annoyances were reported.

The following graphic description is taken from the work of Esquirol "On Mental Maladies," and is of special interest, since, as in the cases just mentioned, the perverted passion was confined to a single object, while the implication of the intellectual faculties was still more apparent:

A lady, thirty-two years of age, tall, of a strong constitution and nervous temperament, having blue eyes, a light complexion, and chestnut-colored hair, had received her education in a school in which the most brilliant future and the highest pretensions were presented in perspective to those young persons who went from this institution. Some time after her marriage she saw a young man of higher rank than her husband, and immediately became strongly impressed in his favor, though she had never spoken to him. She begins by complaining of her position, and speaking with contempt of her husband. She murmurs at being obliged to live with him, and at length conceives an aversion for him, as well as her nearest relatives, who endeavor in vain to recall her from her error. The evil increases, and it becomes necessary to separate her from her husband. She goes into the family of her father, discourses constantly of the object of her passion, and becomes difficult, capricious, and choleric. She also suffers from nervous pains. She escapes from the family of her relatives to pursue *him*. She sees him everywhere, and addresses him in passionate songs. He is the handsomest, the greatest, the most humorous, amiable, and perfect of men. She never had any other husband. It is he who lives in her heart, controls its pulsations, governs her thoughts and actions, animates and

adorns her existence. She is sometimes surprised in a kind of ecstasy and ravished with delight. She is then motionless, her look is fixed, and a smile is upon her lips. She frequently writes letters and verses, copying them several times, with much care; and, though they express the most vehement passion, are proof of the most virtuous sentiments. When she walks she moves with sprightliness, and with the air of one engrossed in thought, or else her step is slow and haughty. She avoids men, whom she disdains and places far below her idol. However, she is not always indifferent to those marks of interest which are shown her; while every expression that is not altogether respectful offends her. To proofs of affection and devotion she opposes the name, merit, and perfections, of him whom she adores.

During both day and night she often converses by herself, now in a high and now in a low tone. She is now gay and full of laughter; now melancholy and weeps; and is now angry in her solitary conversations. If any one refers to these, she assures her that she is constrained to speak. Most frequently *it is her lover who converses with her by means known to herself alone*. She sometimes imagines that jealous persons endeavor to oppose her good fortune by disturbing their conversation and striking her. Under other circumstances her face is flushed and her eyes sparkling. She rages against every one, utters cries, and no longer recognizes those with whom she lives. She is furious, and utters the most threatening language. This state, which is usually temporary, sometimes persists for two or three days, after which the patient experiences violent pains at the epigastrium and heart. These pains, which are confined to the precordial region, *and which she could not endure without aid from her lover, are caused by her relatives and friends, although they may be several leagues distant from her, or by persons who are about her*. The appearance of force and words spoken with decision restrain her. She then grows pale and trembles; tears flow, and terminate the paroxysm.

This lady, who is rational in every other respect, labors and carefully superintends the objects which are adapted to her convenience or use. She does justice to the merit of her husband and the tenderness of her relatives, but can neither

see the former nor live with the latter. The menses are regular and abundant, the paroxysms of excitement usually taking place at the menstrual period, though not always. Her appetite is capricious, and her actions, like her language, are subordinate to the whims of her delirious passion. She sleeps little, and her rest is troubled by dreams and even by nightmare. She has long seasons of wakefulness, and, when she does not sleep, walks about talking to herself or singing. The disease was of several years' standing when she was committed to the asylum. A systematic course of treatment for a year, isolation, tepid, cold, and shower baths, antispasmodics externally and internally employed—none of them succeeded in restoring to her reason this interesting patient.

The following is a typical case of that perverted and uncontrollable sexual desire which ultimately leads to the most profound degradation of the character and the intellect:

Miss D. was a young woman, eighteen years of age, of good education, accomplished, and of agreeable manners. In 1867 she was admitted to an asylum for the insane as a patient. At that time she was, by turns, melancholy and excitable. When by herself, or only in company with women, she was listless and taciturn. In the society of men she was restless, excitable, and amorous in her manner and appearance. Her general health was fair, although she complained that she was weak and suffered pains in many parts of her body. Her memory and intellect were enfeebled, but no delusions were ascertained to exist. Some years previous to her admission she had been addicted to habits of self-abuse, but for a time had partially relinquished the habit. She had been at times excitable and violent toward her parents, who had always treated her with the greatest kindness. Latterly these symptoms had reappeared, together with the other symptoms mentioned above. Subsequently to her admission to the asylum her condition became worse and worse. In the presence of men, she often presented unmistakable manifestations of her amorous desires, and at all times indulged herself in habits of self-abuse, whether in the presence of others or alone. She was inclined to destroy or remove her clothing, and was utterly regardless of her personal appearance or of the opin-

ions of others. She was, by turns, melancholic, stupid, excited and violent. Although indisposed to make any intellectual effort, and silly in her manner and expression, until of late she has presented no marked symptoms of dementia. Her catamenia have been irregular, but her general health and appearance have been usually fair. She has at times suffered from leucorrhœa. No other local cause of irritation has been observed, although the excitability of the parts was so great that an ordinary examination was sufficient to develop a strong sexual orgasm. This case has not been essentially improved.

The following cases were characterized by well-marked melancholia, with suicidal propensities :

Miss E. was admitted to an asylum for the insane as a patient at the age of thirty-three years. She was well connected, and had always led a life above reproach until one or two years previous to the date of her admission. Since that time her character had changed. She indulged in unfounded antipathies against her relatives, and entered into improper associations with men. At the time of admission she was quiet and orderly in her behavior, and though hypochondriacal was, with the exception of an irregularity or suppression of the menstrual function, in good physical health. Mentally she was depressed and suicidal. During the first few months of her residence at the asylum she made several attempts to destroy her life by drowning, or by taking drugs that she supposed to be poisons. She admitted that she constantly practised self-abuse, but insisted that her propensity was beyond her power of self-control. No local cause was discovered. Under the use of emmenagogues, combined with judicious moral treatment, she made a good recovery.

Miss G. was admitted to an asylum in a state of acute melancholia, about eight months ago. At times she became noisy, incoherent, and maniacal, but at other times conversed rationally and connectedly. Was often excitable, restless, and inclined to be noisy at night. Sedatives were administered, without any marked result. About a month after her admission it was found, on opening the door of her room one morning, that she had entirely destroyed and removed her right eye and had somewhat injured the left. She said that her eye

ded her when she looked at the picture of Christ, but that would mutilate herself no more. She was placed in bed, the proper dressings applied. She, however, tried to injure her person with such violence and persistency that it was necessary to apply a restraining apparatus. When unrestrained, she would tear her clothing in pieces with her hands. She also bit a considerable piece from one of her lips, and made such attempts at self-mutilation with her teeth, that other means of restraint were required. She was constantly restrained by day and by night for a period of about three months, at which time the acute symptoms had so far yielded that all restraints were removed, and she was less closely guarded. Her suicidal propensities, however, still remained, and she would endeavor to drown herself, while being bathed, immersing her head beneath the water. It was now noticed that while in the presence of men she was uneasy and excited; her face would become flushed, she would become embarrassed and look in another direction, while at the same time she appeared constrained to remain near, and to press close to them. She selected one of the female patients as her particular associate, and conducted toward her in such a manner as clearly to indicate the true nature of her malady. No abnormal condition of the external genital organs was observed, except a very marked redness and irritation, which might have been voluntarily produced, or which may have been caused by a rather profuse leucorrhœal discharge that was found to exist. This case has improved to a certain degree and is still under treatment.

The following description of an analogous case is quoted from the work of Bucknill and Tuke on insanity:

J. M., aged thirty, a dress-maker, three years before her first attack of mania, from which she recovered, and had not been well ever since. She was a Roman Catholic convert from the Protestant religion, and the causes of her first attack were connected with her change of faith. For her second attack no cause could be assigned. Without any previous symptoms of insanity she went into the parish church of A——, during divine service, threw herself upon the pavement and made a scene. On being removed she was found to be 'raving mad.'

A strait-waistcoat was placed upon her to prevent self-destruction; but after this she bit off the end of her tongue, and attempted to bite off her lower lip, but only succeeded in lacerating it fearfully. She dashed herself against a wall, and bruised herself so that when admitted to the asylum on the following Wednesday her disfigured face scarcely appeared human. She was bruised from head to foot, and her right ankle was abraded from ligatures. She was sensible, and did not appear to be suffering from any delusion; but she made repeated efforts to beat her head against the wall, and said she must kill herself. She refused food. The head was very hot. The catamenia were flowing on her admission. She was ordered a warm bath for an hour, with a cold aucoir on the shaven scalp. She tried to drown herself in the bath, by keeping her head under water. The bath had an excellent effect, and was followed by sleep. It was followed up by a drachm of black-drop night and morning, and by a dozen leeches to the temples, which were repeated three times. She was never left to herself, as she seized every opportunity to suffocate or strangle herself. In the course of five or six days the symptoms abated greatly, and in nine days from her admission her mental health appeared to be perfectly restored. Her features were still greatly disfigured, but she occupied herself with needle-work, spoke reasonably and gratefully, and was in her perfect right mind. Five weeks after her admission she suffered a sudden relapse; she made a violent and indecent attack upon a woman whom she believed to be a man. Her head became hot, her face flushed, her eyelids drooped—the eye being turned upward, the carotids pulsated strongly, although the general pulse was weak. The same remedies which afforded relief before were tried in vain, and for five days she attempted to injure herself in every possible way by thrusting her hand down her throat, by beating her head against the wall or floor, and by attempting to drown herself in the bath. Several nurses were with her night and day, and upon them she made constant attacks of an indecent nature. She moaned and exclaimed, ‘O my God! O blessed Jesus! O save me!’ and evidently suffered great mental anguish. The large doses of opium which were administered

lightest soporific effect, and during the whole of her death she was conscious of the visit of the priest, and appeared to understand the last sacrament administered. But, so long as she was able to lift her head, she seemed to be occupied with a firm purpose of living. Gradually her breathing became slower, and more feeble; and, at the end of the fifth day of the disease, she died from asthenia."

It is observed that, in some of the cases to which reference has just been made, the manifestations of disease are sentimental in character; there being no evidence that gratification was any more an object of thought than in connection with the most exalted sentiment of the opposite sex in persons who are perfectly sane. In other cases the manifestations of disease would appear to be purely sensual in character, and to have arisen from a diseased condition of the reproductive organs.

In the latter class, the terms *nymphomania* and *erotomania* have been generally applied, and are understood. The term *erotomania* is by some authors applied exclusively to the former classes, while others make it designate both; employing the term *erotomania* when they wish to refer particularly to the former. The term *sentimental erotomania* would be preferable. Now, it is not at all certain that sensation as a motive is entirely absent in any case; it is certain that, however evident the local cause, the result, involving more or less of the ordinary sentimentality, is a constant result, however perverted that sentimentality may be. In the present connection the term *erotomania* is employed to designate the species of the disease, while the other terms will be used to designate the

erotomania has been observed in persons of both sexes, ranging from childhood to an advanced period of life. Marked cases of satyriasis and nymphomania have been observed in children from three to six years of age. Nymphomania is developed at the time of the

cessation of the catamenial function, and even as late as sixty or seventy years of age. Youth, however, is the period of life most subject to attacks of *sentimental erotomania*.

Women are much more subject to all forms of the disease than men. Cases of satyriasis, especially, are rare, while cases of nymphomania are very frequently observed.

The subordinate forms under which this disease occurs are manifold. There may be simply an inordinate and uncontrollable susceptibility to fall in love with persons of the opposite sex; or this susceptibility may be limited to a particular individual. As in those diseases in which the departure from the normal standard is in degree rather than in kind, so in these cases the diagnosis is often of extreme difficulty, and must be determined by a comparison of the past with the present condition of the patient, and by a careful consideration of all the concomitant circumstances. In many instances the amorous passion is felt for persons whom the patient has never seen, or who may have only an imaginary existence; and the object of the passion is then supposed to be possessed of the most desirable qualities both of body and of mind, and these supposed perfections form a constant theme of thought and ecstatic contemplation. In the above-mentioned forms the desire for sensual gratification is not indulged, and may even be repressed as an unworthy motive, if felt. Still the sexual feeling, however obscurely perceived, is undoubtedly, even in these cases, an important element of the disease.

Again, the amorous passion for a particular individual may be associated with a strong desire for sensual gratification; or this passion and desire may be exercised toward any person of the opposite sex with whom the patient may happen to be in company. From this point to the most disgusting and degrading practice of self-abuse, the gradation is easy and the result sure.

Erotomania is usually classified as one of the forms of emotional insanity. Insane delusion may or may not exist. The voluntary power is always weakened. There is often melancholia with extreme depression, both mental and physical, and in these cases there is usually a suicidal impulse which is sometimes very strong, and may be accompanied by a desire

utilation. The suicidal impulse probably arises from acting and painful emotions caused by a sense of shame and degradation, and a feeling of utter inability to resist strong sensual impulses and desires.

Among the causes of the sentimental form of this disease may be enumerated—a life of indolence; the reading of sentimental voluptuous romances; a lack of the habit of self-control especially of the emotions; too great seclusion from society of the opposite sex; and the habit of self-abuse. These causes are also efficient in the production of the idiopathic physical form of the disease. Cutaneous eruptions, hæmorrhoids, ascarides, amenorrhœa, ovarian disease, leucœnia, and erethism, are also efficient local causes of the production of erotomania.

Whatever may be the cause or form of the disease, there is always some impairment and sometimes a marked perversion of some of the mental faculties. Cases of self-abuse in which there is no such impairment should not be included in the class of this disease.

Whenever there is an evident exciting cause, the obvious remedy for treatment is a removal of the cause. Hence all sources of irritation are to be removed; habits that act as a stimulus are to be combated; the general health and tone of the system are to be improved; and proper physical and mental treatment are to be provided. But, it must be remembered that the brain is also at fault, and hence, that we can rarely expect the coöperation of the patient. For this reason confinement and other measures of restraint are required to prevent a continuance of evil habits. If self-abuse be either the cause or both a cause and result, it is absolutely essential that it be prevented. This point is unfortunately very difficult to attain. Among the means of prevention, confinement, the hands, and local applications that produce a considerable degree of pain and soreness, are worthy of a trial. In cases in which there was an excessive erethism of the external genitalia, an ablation of the clitoris and of the labia minora followed by the most satisfactory results. But, even in the most extreme measures, success is by no means certain. In some degree of self-respect and self-control still re-

mains, their exercise should be called out to the greatest possible extent. These are of more avail than all other means, and may become effective if judicious advice and stimulus to the will be afforded. The full confidence of the patient should be first secured by the medical adviser. Then the patient should be incited to exercise the utmost self-control within her power, and to promise a confession of every failure to exercise that self-control. The power itself will thus often be so much strengthened as to become efficient. In cases of erotic mania, marriage has been advised as a means of preventing an otherwise fatal result. When this is impracticable, an attempt may be made to substitute another object for the affections.

In cases in which a fair degree of self-respect and self-control still remain, a favorable result may be anticipated if there be no especial improvement of the intellect. In other cases the prognosis must be considered as in the highest degree unfavorable.

ART. III.—*A Letter to the Editor on Some Recent Contributions to Mental Science, Medical Jurisprudence, and Anthropology. Being the Third of the Series.* By GEORGE EDWARD DAY, M. D., F. R. S. Late Professor of Medicine in the University of St. Andrews, etc.

WITHOUT any preliminary remarks, I shall at once proceed to notice the most important of the recent contributions to the study of mental diseases that have emanated from the English medical press:

In the *British Medical Journal* for February 18th, there is a valuable leading article on "The Curability of Insanity," in which the writer combats the popular view that our public lunatic asylums do not attain to such curative results as might fairly be expected of them. "Any one," he observes, "looking over a file of asylum reports, would notice that the average rate of recovery recorded is only about forty per cent. of the admissions, ranging from nineteen per cent. in some asylums, in which the house-steward is the presiding genius and major-domo, up to fifty-five per cent. in others, in which para-

medical authority is maintained. This discovery might seem to invalidate our statements, and to be of a highly interesting description. If the admissions into our public consisted altogether of cases of mental derangement of origin, it would certainly be discreditable to the managers of these asylums to fail in securing recovery in sixty per cent of such admissions. The fact is, however, that recent admissions are termed, constitute in every public asylum a very small proportion of the admissions, the bulk of which consist of chronic and hopelessly-incurable lunatics, or persons in whom the mental aberration has existed for a considerable time, and survived ordinary treatment. Many cases of insanity, in which the symptoms are of a mild kind, which, therefore, remedial measures would be especially applicable, are detained in workhouses or at home until vicious and troublesome propensities are developed—until the best chance of recovery is irretrievably lost. Thus, it comes about that asylums receive only the *élite* of lunacy, and begin treatment where it ought to have been left off. We must recollect that asylums are bound to accommodate all lunatics sent to them; they give no preference to pet maladies, and reject none on account of their intractability. They receive the doomed and the dying, as well as the recoverable. An asylum medical officer has favored us with an analysis of five hundred consecutive admissions into a county asylum, which enables us to state the proportion of incurable cases admitted into such asylums, and which throws much cheering light upon the results of the system of treatment at the present time.

According to this analysis, of 500 lunatics admitted during a short of two years, 195 were found, when admitted, to be incurable, and beyond the reach of any thing but palliative treatment, for the following cogent reasons: 14 were idiots or imbeciles; 15 were above seventy years of age; 24 were in various stages of the euthanasia of general paresis; 24 labored under organic disease of the brain, with various forms of paralysis; 52 were epileptics of more than five years standing; 26 were recognized lunatics of more than five years standing; and 22 were affected by well-developed pulmonary tuberculosis. Of the 305 patients not included in any

of these classes, many were close upon seventy years of age; many were epileptics and lunatics, in whom their maladies, although not of the full term of five years' duration, might still be looked upon as so firmly established by use and custom as only to be eradicable when life itself was torn up; while others were affected by visceral and constitutional diseases which would have been pronounced necessarily mortal, but which could not be taken into account in the general summary given above. We find thus, that of 500 lunatics received into an asylum, fewer than 300, or under 60 per cent., could, on the most liberal construction, be counted as curable or amenable to treatment.

"The second part of the analysis which we have before us deals with the results of the treatment of these 500 patients up till the time at which the analysis was made—that is to say, within two years of the admission of the first of the 500. Here we find that 212 had been discharged recovered; that 14 had been discharged relieved; that 100 had died; that 51 remained under treatment, in an improved state; and that 123 had become worse, and were declining toward dementia or death. Bearing in mind that less than 300 of the patients involved in the analysis could, even in the most sanguine calculation, be deemed amenable to treatment, we must regard these results as very satisfactory. Of these 300, about 70 per cent. had been cured, and five per cent. relieved; while 17 per cent. were reported as improving. A note appended to the analysis intimates that all the 212 patients discharged recovered had been submitted to careful medical treatment, so that the credit of their cure cannot fairly be ascribed to moral influences or a fortuitous combination of events.

"In the presence of facts such as those which we have just cited, it is impossible to entertain any doubt that our public asylums are really doing good, useful, curative work."

A second article, on "Our Lunacy Systems," appeared in the *British Medical Journal* for April 1st, from which we make the following extracts:

"We have no hesitation in stating, most directly and pointedly, that the usefulness of an asylum is in inverse ratio to its size, for the following reasons," which we give in a condensed form:

First, the medical authority or authorities have either perform unprofessional duties to an extent which merges physician in the administrator, or purely administrative are necessary, whose functions are so important as to place them on a practical parity with the theoretical chief. As a, in English asylums the medical element is ridiculously in point of members. From five hundred to a thousand are, or were till very lately, committed to the charge of one superintendent and one assistant-physician. In such concerns the mere clerical work is very considerable, not to speak of the keeping of medical records and attention to correspondence. These duties being fulfilled, scant time is left for the study of individual cases. And this brings us to the second, and perhaps the strongest, reason against the existence of large asylums, which is, *that the lunatic loses his individuality*. The most encouraging feature of alienistic medicine of the present day is the strenuous effort which is being made by students to peer through the thick metaphysical mist which has long hung over it. The influence of the "positive school" of metaphysics has done much, and will do more, in directing the medical mind to a due attention to the study of physiology, pathology, pathogeny, and etiology, in their relation to diseases indicating the functions of the brain. In order that this truly-scientific plan of study should be carried out, it is absolutely necessary that each patient should be individually considered. A careful examination must be made of his physical condition, an accurate note kept day by day of the progress of his case, his fact, his disease must be as studiously watched as that of a patient in the clinical wards of a hospital. The diseases are less complex in asylums than in infirmaries; but, in the latter institutions, we find physicians and surgeons in due proportion to their size, numerous residents, and a host of clinical clerks and dressers. It is utterly impossible for any one or two men to compass in one day thoroughly and completely the work required on the management of an asylum containing more than five hundred inmates. The interest in the individual cannot be maintained, and its loss serves to compromise very especially the hope of his return to the outer world.

The third reason is, that all large institutions for the insane require a rigorous degree of discipline. The larger the asylum

the more do the managers think it necessary to exercise discipline over the superior officers; the more do the officers deem it proper to maintain a severe discipline over the attendants; the more do the attendants exercise a severe discipline over the patients.

Much is said regarding the great calmative influences which are brought to bear on the maniac in an asylum. Does it not mean that within the walls of the asylum a system exists distasteful to every man, and one that even the mind of the insane can recognize, a feeling akin to that of being taken to prison? It may be a useful and necessary influence, but we doubt that it is so in the great majority of cases. The moral treatment so much spoken about is much more physical than is generally supposed, and simply means the recognition by the patient of a disagreeable condition of inferiority to those not socially his superiors. What really influences his recovery is purely physical—an improved hygienic condition, and a certain amount of medical treatment.

The fourth reason is that, out of the difficulties of management and the necessary establishment of rigorous discipline in large asylums, certain traditions have been evolved, as that the lunatic is to be held as an inferior being by the attendants, who, even if well meaning, after a series of years become conservative and intolerant of reforms; that there are certain orthodox modes of repressing sudden outbursts of excitement, “downing” a lunatic, or placing her on her back, “kneading” her thorax and abdomen with the knees, and the belief that medical treatment should be confined to soothing draughts of compound rhubarb-powder.

We resume the consideration of Dr. Laycock's “Lecture on Diseases of Organs and Tissues, as influenced by the Nervous System,” and extract the following paragraphs from the lecture reported to the *Medical Times* for March 18th:

“In diathetic anatomy, diagnosis, and therapeutics, the evolutionary law of tissue-anatomy upon which I found my clinical view of diatheses is an important guide to pathological inquiries. Nothing can be more vague than the current doctrines. Eminent French physicians speak of an ‘herpetic’ diathesis, or of an ‘asthmatic’ diathesis—phrases which have

no definite application to tissue-changes, and are, I
 worse than useless. I must remind you that the word
 'sis' means a special putting together of the funda-
 elements of the body, and has no regard to particular
 or viscera, except in so far as a particular tissue pre-
 tes therein. The general law to which I refer is the
 evolution of tissues in the embryo. This order indi-
 the general or common pathological relations of funda-
 tissues. Firstly, the germinal membrane appears as
 mon basis of all; then follows its division into the
 's' and 'serous' layers. Out of the serous layer is
 the whole voluntary motor apparatus of bones, mus-
 cles, ligaments, and serous tissues; so that, as
 all related to each other by common origin, they are
 to each other nutritionally and diathetically, and have
 y a common relation to a trophical system. The heart
 cular system have a like common evolutionary origin
 the vascular layer of the embryo, which, however, is a
 t product, and has the conjoint qualities of the mucous
 ous layers. In diathetic anatomy the difference is
 by the distinction between gouty degenerations affect-
 structure of the heart and arteries and of the synovial
 anes of joints; and the rheumatic, which involve the
 structures and fibrous pericardium, and aortic and
 valves."

efore we consider special tissue-changes as trophesies,
 clearly understand what we mean when we speak of loss
 nervous debility, and of defective innervation. It is
 om what I have said, that the phrases may refer either
 tive vital energy in general, or to defective regulative
 especially, in which case it would be to the sensory
 of the nervous system we should look. Now, when
 made conscious of this class of changes, pain, languor,
 and other like feelings, are experienced. Hence, it
 seful to inquire, with reference to two kinds of *vis ner-*
 ie one as being a molecular energy, necessary, like
 all healthy tissue-work; the other regulative of its
 ion and application. This latter is therefore needed,
 he end that the tissue-changes shall take place—for we

have seen that they can and do go on independently of nerve—but that they shall take place in their proper or normal order. For example, if a defect in a nerve or nerve-centre (nervous debility) is followed by the production of heat or of uric acid in the tissue it enervates, these changes occur because the tissue is set free from the regulative restraint exercised by the nerve or nerve-centre. Now, I think clinical facts enable us thus to distinguish two kinds of trophic *vis nervosa* with corresponding anatomical seats, for we can differentiate a regulative from an executive kind, just as we distinguish a sensory and a motor. Here, again, the law of evolution helps us to a clearer understanding. Just as the trophic *vis nervosa* is an evolution, and differentiation of vital energy, so that by which we are conscious and act volitionally is an evolution and differentiation of the regulative element of trophic *vis nervosa*. It is that regulative principle which, as manifested in nutrition and development, was, and indeed still is, termed the *anima*, *psyche*, soul; and as manifested in mental life, as the *animus*, mind."

Dr. Laycock then proceeds to the consideration of pain, and asks, "What does pain mean in general?" After describing the pleasurable feeling of health, which he terms *cænæsthesia*, he observes that "the feeling of ill-health generally, or *malaise* or whatever name be given to that which accompanies what is abnormal, if there be a feeling at all, must have its seat in a like portion of the nerve-centres as the feeling of health; and this, in accordance with the principle formally laid down as to the seat of all conscious changes, must be in the brain. Both states of consciousness correspond, in regard to the body, to that unity in regard to the mind which the metaphysicians name the 'ego;' hence these facts prove, in conjunction with many others, that there is a trophic corporeal centre, or series of centres, just as there is a mental centre or series of centres. This we shall be able to fix in a well-defined basilar region of the encephalon, which includes the medulla oblongata, cerebellum, and cerebral ganglia. Whatever may be said of local pain or uneasiness, may be said of these general feelings. Hence we must remember, as an important fact in clinical observation, that all pain, whether it be local or general, and

however named, may be illusive as to both seat and cause. It is so with the feelings as to health and unhealth; just as in a neuralgia, a person may feel as if he had disease of an organ when it is healthy, and *vice versa*; or, when strong and well, may feel ill and weak, and have delusions as to the nature and cause of his illusive illness and weakness. The term 'well' means, as thus used, that there is no disease of organs, or tissues, or blood, as causes of the feeling of illness, but that there is central disorder or disease as a neurosis, termed hypochondriasis and hypochondriacal melancholia. When it is not purely sensorial, the painful state is best named dysphoria. These centric suffering states (phrenalgia) are often as painful as neuralgia. I have known hypochondriacs with the feeling of muscular debility, yet strong in muscular development, as incapacitated for labor as if really weak and ill in their muscular system. On the other hand, a patient seriously diseased may feel quite well—may have, indeed, a pleasurable feeling of health. This I term 'euphoria.' It is this, when manifested in cases of phthisis, which has been termed the *spes phthisica*. A wider euphoria is seen in certain cases of insanity with paresis, in which, from a particular kind of morbid-brain nutrition, the patient thinks himself endowed with strength beyond estimate. A third class of cases are those with no sense or feeling; they have apathy or aphoria. Such persons, when very seriously ill—ready, in fact, to die—make no sign of feeling ill. This state occurs in dangerous cases of epidemic cholera, and in fevers of a bad kind; the patient will go about, wholly unconscious of serious illness or of his impending fate."

"What is said of these general bodily feelings, as commonly altered in disease, applies equally to special bodily feelings and conditions. Exaltation, perversion, abolition of sensibility, have their respective trophic conditions. The results of anæsthesia of the pulmonary system, with evolution of motor *vis nervosa*, are seen in another form than the *spes phthisica*, when tubercular meningitis comes on in the course of a phthisical case. Even with large vomicæ the cough and expectoration will cease; the voice, as the patient raves deliriously, becomes loud and strong, and the corporeal strength

marvellously developed—conditions all due to changes in the basal trophic region I have hinted at. On the other hand, there are cases of insanity in which the central trophic region is defective in both sensory and executive or motor *vis nervosa*, and the results are wholly different, manifested as low forms of pneumonia, sometimes ending in gangrene of the lung; precisely for the same reason that sloughing occurs in certain kinds of palsy, as in typhus and paraplegia.”

“The clinical rule deducible from these considerations is, that when we desire to ascertain the causes and consequences of trophic nervous debility, we inquire whether it is the regulative—i. e., sensory—*vis nervosa* that is deficient—or the executive—i. e., motor. Excessive use (functional activity) often determines this. Pleasurable sensory excitement, if excessive, is a using up of the sensory or regulative *vis nervosa*. This is one cause of the debility induced by sexual excesses, and of locomotor ataxy as a special consequence of that debility. Pain, too, when excessive, is exhausting. Excessive thought, without anxiety, uses up the materials subservient to sensory excitation; and in this way the regulative energy as regards organs and tissues may be defective, and neurotic disorders of all kinds follow. But excessive thought, with mental anxiety, care, and pain, as grief, is much more exhausting, and, therefore, more commonly followed by trophics.”

The following extracts are taken from a lecture reported in the number for April 8th. After noticing the connection between the nervous system and blood-diseases, he proceeds to the consideration of muscular energy, which “is the type of all motor power as it is of vital energy. The *vis insita* of the voluntary muscles means electricity of high tension. It has important relations to the *vis nervosa*. It is thought, generally, that the nervous system not only excites the evolution of muscular energy, but supplies it in part. Dr. C. B. Radcliffe has, however, by a connected series of experiments, shown that the whole power is due to the muscle.” After explaining the views held by this physician, he criticises them in the following terms:

“The weak points in this ingenious theory are two: 1. It assumes that the contractility of muscle is, like that of caout-

physical in the sense of not being vital; and, 2. It explain important facts. How is it that a furious can put forth such enormous strength when the dis- of the electricity are morbid? Besides, muscular action is not a persistent tension, but consists in a rapid te lengthening and shortening, as is proved by the aph. Apart from the theory of muscular contraction, etric theory of a *vis insita* has support in clinical obser- . When we remember that nerve as well as muscle is ate of electric tension, we can understand how disturb- in the electric tension of the atmosphere will induce atic and neuralgic pains in persons predisposed thereto, others affect the feelings and intellect. It is to some ion of this kind that we must attribute the neurotic in- s of certain winds—the east wind in this country, the wind in certain other regions, as at Buenos Ayres, where own to excite in some great irritability of the sensory is system. Electrical therapeutics are also rendered precise. Continuous currents of low tension, such as of mmon galvanic battery, have a paralyzing influence on erve and muscle, the sensibility of the one and the con- ty of the other being suspended. At the moment of ; or of opening the current, the opposite condition is d; and this is what results from the use of the coil-ma- you excite the contractility of the muscles and sensi- of the nerve. Again, the line of physiological activity ch I referred in a former lecture must be considered. a part of a nerve or of a muscle is subjected to a centrip- ‘inverse’ current for some time—two or three hours— art which lies between the nearest galvanic (positive) nd the muscle is found to retain its electricity, and re- ts irritability; but a centrifugal or direct current has osite effect. When the irritability of a muscle is wholly has no electricity. These are some of the points it is ary to remember in the treatment of neuralgia and palsy etricity and galvanism. In improving intuition, you : the natural electricity. Doubtless spasm could be re- in certain cases by the continuous current, and I think been tried successfully.”

Mr. Balfour Browne, barrister-at-law, and son of the celebrated physician who so long and successfully presided over the Crichton Asylum, at Dumfries, has commenced a series of papers on "Partial Moral Mania," in the *British and Foreign Medico-Chirurgical Review*. Under this heading he proposes to consider—1. Kleptomania; 2. Erotomania; 3. Dinomania; 4. Pyromania; 5. Suicidal Mania; and 6. Homicidal Mania. *Kleptomania* forms the subject of the first memoir, which is by no means easy to analyze. The writer begins with the idea of property, and the development among savages of the notions of *meum* and *tuum*. The theory of simple exchanges and the origin of money are then noticed. From such rude beginnings as these we arrive in time at a stage where there is a necessity for law, or "a rule of civil conduct prescribed by the supreme power in a state, commanding what is right, and prohibiting what is wrong."

Enough has been said to enable us to explain the connection of the idea of property with certain diseased conditions that may be brought under the notice of the medical jurist.

While there are many who, with a false knowledge that they are committing a crime, fraudulently deprive their neighbors of their goods, there are "others, who, through the disordering effects of disease, fail to perceive the real connection that exists between owners and goods," or, if they do understand it, are, from the inability to be influenced by ordinary motives, unable to refrain, for the mere pleasure which arises from the act of appropriation. . . . We are compelled to believe," says the author, "notwithstanding what some extreme thinkers say, that larceny is not necessarily connected with insanity; but, at the same time, we must admit that theft may become a symptom of, and often is indulged in consequence of, morbid mental conditions."

He then adduces various cases in which kleptomania is only a symptom of well-marked mental disease, and in such cases as these there is no real difficulty in forming a decision. When, however, theft is the only sign of the presence of a morbid mental condition, the question as to whether the individual should be exempted from punishment is much more difficult of solution. Thus, a clergyman, distinguished for his learning

and piety, was in the habit of stealing Bibles, but nothing else. He manifested no other symptom of insanity, and excused his acts on the ground that it was necessary to propagate the gospel. Other cases are quoted in which persons of the highest general character could not refrain from stealing. In one instance a gentleman of high rank used to appropriate the jewels when he visited at a friend's house, and, what is even more strange, when he returned home the stolen articles were by *his own directions* restored to their owners.

Mr. Browne cautions medical men, who have to deal with such questions, from paying too great attention to the existence of some stupidity in the execution of the crime in question, as proof of the existence of insanity. If the person can be proved to have done some merely foolish thing, his neighbors come forward and assert that he is insane, without knowing the true significance of real insanity. Again, the association of unusual circumstances with the crime must not be regarded as indicative of insanity. A good many years ago a Scotchman, named Campbell, supported his mother by the produce of his robberies, and it was ascertained that upon one occasion, when crossing a church-yard at night on his way to commit one of the robberies, with which he was charged, he, unconscious that he was observed, knelt down and prayed for a blessing on his undertaking. It was pleaded that so pious a man must be mad! But the jury found him guilty, and he was hanged, as Mr. Browne seems to think, deservedly.

The following rules are given for the detection of real disease as the existing cause of the criminal act:

1. The means, the position, and the rank of the individual, should be taken into consideration.
2. The value of the article taken should be ascertained. In many cases of true kleptomania the value of the article stolen does not seem to be of much importance. To the true thief the value is all-important.
3. The precautions taken by the individual will occasionally throw light upon the question as to whether disease is present or not. Some kleptomaniacs steal openly; but cases do occur where much ingenuity is shown in attempting to conceal the act from the knowledge of others. The pre-

cautions taken to avoid suspicion are, however, often indicative of the presence, rather of moral turpitude than of moral insanity.

4. Very frequently the kleptomaniac is not unwilling to avow the act; confessing that he knows he was doing wrong, but could not resist the temptation. In such cases we often find the individual restoring the stolen goods to the owner.

5. Kleptomaniacs in many cases make no manner of use of the stolen article, their satisfaction being in the simple act of taking it; and, if they do not cast away the article or disregard it, they almost invariably hoard it with other property similarly acquired.

6. A curious fact has been observed in connection with this diseased propensity, viz., that in many instances it is felt only in relation to bright or glittering objects, as new shillings, bright silver spoons, etc. Casper relates the case of a lady who committed thefts in three goldsmiths' shops during her pregnancy. After her accouchement she confessed to her husband that she had, during her pregnancy, an irresistible desire to possess herself of shining objects, and admitted having taken the articles; adding that, on one occasion, she went to return the stolen object, but was restrained from doing so by the belief that it was her own. Casper, who was referred to, decided that the diseased propensity was not irresistible, and that she was responsible for her actions; and he gave as reasons: 1. That, although she had besought her husband not to take her to places where shining objects were to be seen, she went to goldsmiths' shops of her own accord, and without any necessity for doing so. 2. That she paid away silver. 3. That she broke up the objects she stole in order that they might not be recognized and lead to her detection. 4. She had not gone to the same goldsmith's shop twice. 5. She had concealed her conduct from her husband. 6. And, when she was interrogated, had made many false and contradictory statements.

Mr. Browne sums up as follows:

"If the individual is charged with theft, and it can be shown that he was in a condition to be deterred by the fear of punishment; if, for example, it is shown that it was the

advantageous circumstances that tempted him to commit the crime; if he can be shown to be, even with his diseased propensity, under the influence of ordinary motives—he ought to be held responsible for his acts. If, on the contrary, he is not in a position to weigh motives, and if his incapacity is due to disease; if no ordinary circumstances induced to the theft, as no ordinary circumstances could have restrained him from its commission—he ought to be regarded as irresponsible, and ought to be exempted from any punishment.”

I may add that, on these principles, he regards Casper's decision as “in accordance with sound principles of law and medicine.”

Mr. Nankivell, of St. Bartholomew's Hospital, Chatham, reports a case of *tetanus* and a case of *trismus*, each of which was treated with chloral. The first case was that of a boy, aged five, who, on April 9th, fell and slightly cut his left wrist. Six days after the accident it was observed that his wrist was bent, and that his fingers were strongly flexed and drawn into the palm of the hand. On admission, six days later, the wound was healed, but the flexion continued. On April 23d, two days after admission, he had a violent spasm, which nearly threw him out of bed, and the spasms continued with increased severity till the 26th, when he died. The chloral was given in three-grain doses thrice a day, and afterward in larger doses. The second case was that of a boy, aged fourteen, who was admitted on September 6th, having had his left little finger amputated a week previously, in consequence of its having been bitten by a donkey. A week after the accident he entered the hospital, having suffered for four days from stiffness of the neck and inability to open his mouth. He was once ordered a purgative and ten grains of chloral thrice a day. On the 9th he had an attack of opisthotonos, and the chloral was increased to fifteen grains. He was apparently quite cured by the 21st, and on the 28th he left the hospital. Mr. Nankivell doubts whether the chloral had much effect on the disease in these cases.

Dr. Dorigo has published, in the *Gaz. Med. di Padova* of December last, the case of a boy of thirteen, who suffered from tetanus in consequence of a wound of the sole of the foot.

The final recovery took place on the fifty-fourth day, the average daily dose of hydrate of chloral having been ninety grains. When the narcotic effect became weak, the chloral was immediately given again. Dr. Grandisso-Sylvestri mentions in the same paper another case of a girl eight years old, who had tetanic attacks after a lacerated wound of the middle finger of the right hand. She soon recovered after having ingested about half an ounce of chloral in five days. Dr. Ben-sasson, of Tunis, has also communicated to the *Imparziale*, of Florence, February 16, 1871, the successful case of a boy aged thirteen, who was seized with tetanus in consequence of a nail running into his foot. The treatment lasted thirty-five days, about five ounces of chloral being used altogether.

Turning from the treatment of tetanus to the pathology, we may notice a paper read by Dr. Clifford Albutt, of Leeds, to the Pathological Society, in which he describes the peculiarities of the spinal cord in four cases of the disease. Comparing the appearances in the several cases, it was seen that they were similar, only differing in degree as regards softening; in two out of the four cases meningeal hæmorrhages were observed, the vessels of the cord were generally distended, thickened, varicose, and plugged; and in one case there was universal thrombosis, with spaces around the vessels filled with matter resulting from the granular disintegration of the clots. In two of the cases there was considerable blood-staining of the cord by oozing from, if not actual rupture of the vessels, and in two cases hæmorrhage into the cord in different places. Both in the pia mater and in the central gray matter similar vascular changes were observed. The central canal of the cord was stuffed with epithelial matter in over-abundance. There was nuclear proliferation in the connective tissue, probably in excess of health. The cells in the anterior horns were singularly wasted in a very symmetrical manner, no doubt due in part to exudation about the vessels, but also to changes in the cells themselves. The cells were the subject of yellow disintegration, beginning in the centre of the cells, and invading them from centre to periphery. Many were seen to have run together, forming an irregular and more or less fatty mass, these masses giving rise

to the appearance of small yellow masses in the anterior horns. At any rate, the latter were destroyed more or less by exudation into them, and peculiar degenerate changes in the hæmorrhage and thrombosis he had described were not *post-mortem* conditions.

The *Medical Times* for April 8th contains a brief abstract of Prof. Steiner's "Memoir on Chorea," which is based on the observation of fifty-two cases treated in the Children's Hospital at Prague. Of this number three cases were fatal. *The first case*, a boy, of eight and a half years, was seized with chorea after falling down a cellar-step, and the autopsy pointed to a growth of cellular tissue in the substance of the spinal marrow as the probable cause of the disease. Chorea came on *in the second case*, a little girl of nine years old, a few days after she had been playing, and with back to back, and hands over her head, had been swinging her companion. She died, and an abundant extravasation of serum fluid into the spinal cord, with hyperæmia of the cord, and its meninges, was found after death—changes which appeared to be the result of her violent exertion, and the cause of the chorea. This conclusion was confirmed by four other similar cases resulting from the same cause, which recovered. *In the third case*, a boy, of six years old, it was proved that the chorea was the expression of inflammatory exudation into the spinal canal, following an attack of articular rheumatism with consecutive peri- and endoritis. The patient was improving, when sudden serous effusion into both pleuræ, with acute œdema of the lungs, supervened. Out of two hundred and fifty-two cases the author has only seen four cases occur *in the course of acute articular rheumatism*. He regards the frequent coincidence of the two diseases in France as due to some local influences, but comes to the conclusion that acute rheumatism, with or without endoritis, may cause chorea *in a certain number of cases*. In other cases the author considers chorea to depend essentially on a disturbed nutrition, and on increased excitation of the spinal marrow. The cause of this spinal irritation is, in the majority of cases, anæmia and a faulty condition of the blood.

In a smaller number of cases, the spinal irritation seems to arise from changes in the spinal cord and its membranes;

as, for instance, in the case related above, in which a growth of cellular tissue was found in the substance of the cord. It is possible that in many cases similar recent growths have been present without being discovered; hence, a thorough microscopical examination of the spinal cord is most essential to the right understanding of the true nature of chorea. The growth may be small, circumscribed, or diffuse; may cause slight or serious mechanical irritation; and the symptoms vary accordingly. In short, the author regards chorea as an irritation of the spinal cord, induced and maintained—1. By anæmia; 2. By hyperæmia; 3. By serous and hæmorrhagic exudations; 4. By new growths and organic changes in the region of the spinal marrow and its membranes. This spinal irritation may have a traumatic or rheumatic origin, or may result, as above, from some anomalous conditions of development and growth. The author, therefore, classes chorea among affections of the spinal cord.

With regard to treatment, on the principle that chorea is, in the majority of cases, associated with anæmia, he gives iron alone, or in combination with nervine tonics, as zinci oxid. If it be associated with rheumatism, he gives quinine and digitalis, but the most successful remedy in his hands has been Fowler's tincture, which he has rarely found fail, especially if iron be given first. The largest dose in one day was eight drops, but he begins with a dose of one drop, and gradually increases it. Its use is not continued after fourteen days, if no benefit results. He also uses cold water in many cases in the shape of wet sheets.

The difficulties in the diagnosis of *cerebral hæmorrhage* and *drunkenness* are well illustrated in an article on this subject by Dr. Hughlings-Jackson, in a recent number of the *Medical Times*. After referring to the valuable paper on alcoholic coma, and difficulties of its diagnosis, by Dr. Woodman, in the *Medical Mirror* for 1865 or 1866, he describes a case reported by Mr. Mackenzie, which was admitted into the London Hospital:

James R., aged forty-five, cooper, admitted at 4.30 and died at 7.15 P. M. When seen, he was lying quietly on a couch in the receiving-room, partly on his back and partly on

his right side. When roused he became violent, and tried to strike Mr. Mackenzie, as he made a stethoscopic examination. He swore abundantly, when his eyelids were raised or he was otherwise excited. He always turned to the right, away from the light, and *never to the left*. Pupils equal and normal; body cold and clammy, pulse 51, respiration 21; temperature in axilla 96.2; no cardiac bruit; face not drawn to either side. When carried up-stairs to a ward he had to be strapped to the retractor. He put out his tongue when roused and told to do so, but would not or could not give his name. His wife could not make him recognize her. He sat up in bed, with his hands pressing the front and back of his head, saying, "John," "Jack," and "I am dying," several times. He sat on the edge of the bed, grasped the chamber-pot, used it, and then threw himself back in the bed, turning over to the left side. About 6.30 he became worse; he was very cold; his right eye was turned inward, and he died at a quarter-past seven.

With regard to his previous health his wife reports that he took stimulants freely, but did not get drunk. He was liable to pains in the head, especially the vertex, and often vomited the first thing in the morning. Lately he had been very sleepy, and started and talked in his sleep. He was very liable to fainting-fits if frightened. When he went to work on the morning of the day on which he died, she thinks, he felt ill, but not worse than on other mornings.

A fellow-workman thus describes his seizure: He was hard at work, when he turned round to the man who was next to him, and looked him straight in the face, as though he was going to speak to him. He said nothing, however, but gradually slipped down on to the ground. They ran to him, and found him very red in the face, and red all over, but not more so than a man usually is who had been doing the work he had. He then turned white all of a sudden. They got him some brandy, but he could not swallow it. They tried to make him speak, and to show signs of recognition, but failed. One man noticed that the left eye was more opened than the right. This he is quite certain of, as he looked into his eyes to see if he would know him. They got him into a cab to bring him to the hospital, when he gave utterance for the first time, ex-

claiming several times, "God d—n!" He put his left hand up to his head several times. He could not have used his right arm, as he was supported on that side, thus constraining that arm.

Autopsy.—There was most extensive meningeal hæmorrhage. The blood lay in great bulk at the base, extended to all the fissures, and irregularly to the upper surface. He was as near as could be estimated quite like that of a case of rupture of an aneurism of the posterior communicating artery on the table at the same time. But in James R.'s case a most careful search disclosed no aneurism. There were no bruises of the head, no fracture of the base, and no bruises of the brain. Probably a small aneurism was overlooked, although an hour was spent in the search for one. Both lungs were very bulky, very oedematous, soft, and marbled dark and white. In a few parts were black, not well-margined patches, but no distinct apoplexies. Heart: left ventricle firmly contracted, and its walls thicker than natural. No valvular disease except a patch of atheroma on the aortic segment of the mitral valve. Vegetations were carefully looked for. The muscular structure of the heart was broken down rather readily, but to the naked eye looked healthy. Aorta: extensively atheromatous. Liver much congested; spleen very small. Kidneys: capsules somewhat adherent, and the surface beneath faintly granular; cortical substance not diminished; medullary cones and pelvis intensely congested. Stellate veins prominent.

At a meeting of the Royal Medical and Chirurgical Society, February 28th, a paper by Dr. Hilton Fagge was read "On Sporadic Cretinism occurring in England." After a brief reference to the occurrence of endermic cretinism in Somersetshire (as described by Dr. Hugh Norris, of South Petherton), the author passes on to the consideration of a disease of which a few scattered examples have been recorded, and which has been termed cretinism, but which differs in certain important respects from the endemic form of the disease.

The features in which this "sporadic cretinism" resembles ordinary "endemic cretinism" are the following: The body is exceedingly stunted; the hands and feet are short and broad; the face is broad; the eyes are widely separated by the flat

not of the nose; the alæ nasi are thick; the nostrils are rounded; the mouth is very large, and generally wide open; the lips are thick. When "sporadic cretinism" is congenital, it is also attended with deficiency in the mental powers, varying in degree, but of a character very like that which belongs to the "endemic" form of the disease. The child is quite free from the mischievous tendencies of the ordinary idiot. It is cold-tempered, and appears to be pervaded with a placid contentment. It often sits for hours perfectly quiet, wherever it may be left, and it is disinclined to move of its own accord. Sometimes it walks only with the assistance of a chair, even when it has passed the age of puberty. It is not rarely deaf and dumb. The resemblance between endemic cretinism and the disease now under consideration was pointed out to the author by Dr. Gull. In certain important respects, however, this disease differs from ordinary cretinism. In the first place, it is sporadic. It does not arise by the intensification of a local morbid influence, of which the earlier manifestations are evident in the parents of those affected with it. It springs up, generally without apparent cause, in the offspring of a healthy father and mother. Again, it is not necessarily congenital. In a case exhibited to the Society at its meeting, this morbid change commenced at the age of eight years. Up to that time the patient, the daughter of people in comfortable circumstances, had been well developed. She had an illness, which was believed to be measles, after which she ceased to grow, and her bodily configuration underwent a complete change. Now, true endemic cretinism is said always to commence before the end of the fourth year. Goitre is never present in sporadic cretinism; indeed, of the only two *post-mortem* examinations which have as yet been made in such cases, and which were performed by Mr. Curling, no trace whatever of the thyroid body could be discovered. So far as can be ascertained, it appears probable that the thyroid is likewise absent in the four cases which have recently come under Dr. Fagge's observation, and of which an account is given in the paper. On the other hand, in all these four cases, and in the few examples of a similar kind that have been placed on record by other observers, there have been invariably present certain

soft, symmetrical tumors, lying one on each side of the neck, just outside the sterno-mastoid muscle. One writer has described these tumors as venous, and they have sometimes been supposed to contain the apices of the lungs, since a distinct respiratory murmur has been heard on auscultation over them. But Mr. Curling showed that they consisted simply of fat, which was not enclosed in any distinct capsule. Of the four patients who have recently been under the author's observation, one (the girl in whom the disease began at eight years old) is now seventeen years old, and is four feet one inch in height; another, a boy, is eight years old, and is two feet seven and three-quarter inches high; a third, about twenty years old, is two feet four inches high (this is a boy or man); the remaining patient, a girl, is twelve years old, and three feet ten and a half inches in height. The author is disposed to adopt Mr. Curling's opinion that the atrophy of the thyroid body (if this should turn out to be a constant feature in sporadic cretinism) is the cause of other phenomena of the disease; and in the concluding part of the paper an hypothesis is advanced, which may, perhaps, explain the apparent contradiction which is involved in the association of this affection with wasting of the thyroid body, while the other form of cretinism is connected with goitre. At the same time, it is thought that this hypothesis affords an explanation of certain peculiarities in the relations between endemic cretinism and goitre which have hitherto appeared to be difficult of comprehension. Goitre is endemic in many parts of England where cretinism is known. Goitre is the earlier effect of the endemic influence; cretinism shows itself when that influence has been intensified by operating on more than one generation. Hence, it might be inferred that the worst cretins would invariably have very large goitres. Such, however, is not the case; they have often no enlargement of the thyroid body. These considerations have led some observers to think that the association of endemic goitre with endemic cretinism is a mere accident. They rather appear to prove that there is a certain antagonism between the two phenomena. A large goitre may possibly have the power of protecting the individual against the more severe effects of the endemic influence. The most careful investiga-

as failed to show, either in the air, the water, or the soil in the valleys, the presence of any element which is absent where cretinism does not prevail. Hence, if one could discover a counteracting tendency, it would not be improbable that the cause of cretinism prevails much more widely than the disease itself, although, doubtless, with an intensity varying in different localities. The author thinks that to counteract the cause in its slightest degrees may be one of the functions of the healthy thyroid body, which may thus be supposed to perform under ordinary circumstances the same office which the gland hypertrophied to form a goitre is imagined by him to perform out in those districts where cretinism is endemic. If so, one can see why wasting of the thyroid body should, in itself, produce a form of cretinism.

Langdon Down had been very much interested by the disease and had, at present, twelve cases of the class referred to under his care. In none of them was there goitrous ancestry, when not congenital, he connected the disease with the want of second dentition, rather than with measles or any other ailment. In some of his patients there was presumptive evidence of parental intoxication at the time of procreation. A distinction could be drawn between sporadic cretinism and endemic on the ground of quietness, because there existed a large number of quiescent idiots, chiefly those whom he had described as of the "Mongolian" type.

The most important article in the April number of the *Journal of Mental Science* is that by Dr. Boyd "On General Paralysis of the Insane, and on the Morbid Changes found in the Spinal Cord." Although every physician who has devoted himself to the study of diseases of the nervous system has met with this affection, and succeeded in correctly diagnosing it, he could give so correct a sketch of its synthesis, based on the examination of one hundred and sixty-two fatal cases, as is given in the following extract:

General paralysis was first noticed by Esquirol in 1805, as a frequent and fatal complication in insanity. It is described as consisting of a general and gradual loss of power in the voluntary muscles, a tremulous motion of the tongue and not observed with indistinct articulation or a faltering in

the speech, and a difficulty often in pronouncing the letter R. When protruded, the tongue does not incline to one side. A similar embarrassment is observed in the gait, and, lastly, in all the muscular system.

"The patient walks stiffly, deviates to one side, stumbles going over a step; still he perseveres and takes pleasure in walking about; he is restless and desires change. In attempting to run, his course is like that of a drunken person; he stumbles and frequently falls. A state of morbid tension exists in all the muscles, he comes awkwardly down on the soles of his feet, the arms and hands now become stiff, his arms are extended, objects are grasped convulsively, and sometimes suddenly let fall; the eyelids are widely open, the jaws firmly closed, sensibility becomes blunted. The paralysis is often more marked on one side of the body than the other. At first it is partial, it then invades a greater number of muscles and becomes general. Its progress is regular, it goes on constantly increasing; language is replaced by confused sounds, while the understanding grows weak, a melancholy stage usually exists, and Prichard states that, whatever character the disorder of the mind may have presented, it soon passes into a state of chronic dementia. The special senses generally remain to the last. The cutaneous sensibility is usually blunted, but it occurs in transitory states that the slightest touch excites extended reflex movements, occasionally preceding convulsions; after each attack there is an increase of the paralysis and of the mental dulness. Digestion is disordered, and constipation is usually a most persistent symptom.

"Three distinct stages have been recognized by writers. In the first there is rigidity of action, the movements, although uncertain, retain a certain vigor. In the second stage there is a relaxation, or a state of resolution always increasing, of the muscular structure. The patient at last lies prostrate; the parts pressed upon become excoriated and ultimately gangrenous. The excretions are involuntary, convulsions and comas supervene, which continue for many hours, and are frequently repeated for several successive days. After these seizures the malady usually proceeds rapidly to its fatal termination.

"The first symptoms are usually psychical; in the majority of these cases the paralysis succeeds the intellectual disorder.

The motory disturbances occur in individuals already mentally deranged, and appear years or months after the psychical symptoms. Perversions of the character are sometimes observed, and violations of property, from the idea that the objects belong to them or from an irresistible desire to gratify an impulse. The first symptoms are generally accompanied with vague delirium of mania. Some have very extravagant ideas. In the later periods these ideas disappear. The weakness of the mental faculties becomes more profound as the paralysis becomes more marked. In the advanced period they become emaciated, and require to be fed; at first they are greedy, and the nutrition is well maintained. At the last, gangrenous spots appear on the skin, abscesses form, hectic fever and pyæmia occur in some, others have diarrhœa, pneumonia, bronchitis, or pulmonary phthisis, as the fatal terminations. In a few, the paralysis recedes the mental derangement. Baillarger goes so far as to declare that the paralysis is the primary and leading symptom of the disease, and the insanity secondary and accessory. It should, however, be kept in mind that a general paralysis, similar in all respects to that now described, occurs sometimes without being followed by insanity, as has been observed by Delaye and Foville, who saw induration of the spinal cord with effusion of serum in two cases of general paralysis unattended by insanity. Three cases have occurred within my own knowledge recently."

After describing these cases, the author proceeds as follows:

"A case of general paralysis without mental disorder, remarkable for the want of power to raise the foot over the slightest obstruction, and which continued for fifteen years, was that of a gentleman engaged in an arduous profession. Until the last three years before his death, he was under the care of a practitioner, who prescribed a generous diet, tonics, ammonia, and 'liquor secale cornuti,' in doses of ten drops three times a day, from which the general system derived benefit.

In cases of *general paralysis*, some obvious disease of the cerebro-spinal organs is invariably found to exist.

Out of 924 deaths in the County Somerset Asylum, 162, or nearly 18 per cent., have had this disease, and the proportion of males to females was just 4 to 1. The youngest male

was 26 and the oldest 75; the age at which it was most frequent was 37 to 47; in the decennial period from 30 to 40 there were 40, from 40 to 50 there were 53, from 50 to 60 there were 23, from 60 upward only 6 cases. The married greatly exceeded the single."

The causes of death, as determined by *post-mortem* examination, are unfortunately not tabulated; but, from the reports, of each decennial period, it is seen the disease of the spinal cord, brain, and their membrane, was invariably present; distinct disease of the cord (softening and sometimes enlargement in recent cases and induration, and atrophy in chronic cases) being present in an enormous majority.

The treatment adopted by Dr. Boyd was general for the improvement of the bodily health, and special for the specific disease: the latter treatment consisting in setons to the nape of the neck, cupping, and blisters to the spine; the solution of bichloride of mercury, iodide of potassium, and sometimes strychnine, opiates, etc. Concerning recoveries he stated, in the subsequent discussion, that they "sometimes take place," and referred to cases given in his paper. Two of these were discharged recovered, but after several months relapsed; another recovered from the paralysis, but is still in a state of dementia.

The first speech that followed the reading of the paper (which extends through twenty-four pages of the *Journal*) was by Dr. Adams, who referred to the far greater frequency of the disease in males than in females (four to one, according to Boyd), a view that coincided with his own experience, and to the duration of the disease. While Dr. Boyd put it at about ten years, Dr. Adams would fix it at nearly double that period. Dr. Adams further directed attention to the fact that in the disease the temperature of the body is considerably increased. He was followed by Dr. Crichton Browne, who, from an experience of several hundred cases, believed that five males suffered for one female, the cause of the unequal distribution of the disease being due to the greater "struggle for existence" in men. The nervous centres give way under the strain imposed upon them, and, "by a hideous kind of poetical justice" general paralysis becomes a distorted reflection of the follies of the age."

After touching on the earliest symptoms of general paralysis, Dr. Browne went on to express his belief that it consisted in a diffuse periencephalitis, preceded by repeated and continued cerebral hyperæmia, induced in its turn, in instances, by excessive and ill-regulated functional action of the brain. This periencephalitis, he said, resulted in degeneration in the vessels and membranes, in atrophic changes in the cortical and medullary substance, and perhaps in an excessive formation of connective tissue. It had some claims to a specific character, and presented one or two varieties. In examining the brains of general paralytics, dying in the Westinghouse Asylum, he had been much struck by the constant, uniform, and universal thickening of the pia mater and its adhesion to the convolutions beneath. It had been his practice some time past, with a view to some investigations which he was pursuing, to strip the brains, examined in the Westinghouse Asylum, entirely of their membranes, and this process enabled him to notice the tenacity of the attachment of the pia mater to the subjacent cortical substance, which he could only compare with the adhesion of the capsule to a contracted kidney. In many cases the pia mater could not be removed with great difficulty, and in shreds, be separated from the surface of the convolutions, which were left rough, torn, and abraded, after its removal. The degree or extent of adhesion of the pia mater could not properly be estimated by the ordinary plan of tearing off a small portion near the fissure of the Rolandic sulcus, as in that quarter of the brain the adhesions are the least firm and numerous. He went on to say that the prevailing opinion was that the disease was incurable, but that his experience led him to the belief that, in the earlier stages, at least, it might be arrested if not cured. Counter-irritation by the shaven scalp, combined with the external use of biniodide of mercury and iodide of potassium, had yielded encouraging results in his hands. He had also found the Calabar bean (the extract being given in doses varying from a quarter grain to a grain) of great service in this and other forms of organic cerebral disease. In conclusion, he referred to an important point in differential diagnosis. He had remarked that the muscle earliest and most decidedly affected in this

disease is the great zygomatic, the trembling of which *must* have been noticed by every one as an early symptom. This is classed by Duchenne as specially the muscle of benevolence, and it is curious to detect in this the intimate connection of the dental and the motor symptoms. But trembling of the lip is also an evidence of emotion, as in the child about to cry, or as in the agitation of incipient mania, while it is not always easy to distinguish from general paralysis. The emotional movement of the zygomatics is, however, bilateral, those of the two sides trembling consecutively; while in general paralysis the movement is unilateral or alternative, limited to one side, or passing from the one to the other.

Dr. Tuke said that, from his Hanwell experience, he should believe that at least eight men were affected for one female. He agreed with Dr. Browne in regarding it as a great error to suppose general paralysis incurable. In his own practice he had found the bromides useful, and in the occasional paroxysms of violence could recommend Dr. Lockhart's combination of morphia and digitalis. Like the first speaker, he regarded the average duration of the disease in fatal cases as about four years.

Dr. Mercer, of the Lancashire County Asylum, has published, in the *Medical Times* for April 22d, an instructive paper on "The Use of *Chloral Hydrate* in Lunacy Practice." He gives the details of eleven cases. In nine of these, the patients being mostly noisy and violent, the results were most satisfactory, while in two it was of no service. He sums up as follows: "From a study of these cases, the following conclusions on the virtues of chloral hydrate, given as a hypnotic draught, seem fairly deducible: 1. In very many bad cases of noisy habits during night, it is a powerful and efficient hypnotic, and more certain than an opiate. 2. The effects of the drug do not fail of development through long-continued use of it in a uniform dose. 3. In the most intractable cases of noisy habits, it is probably of less service than an opiate; such cases it would seem, as those of intensely maniacal and excited patients, who, in a previous attack of mental derangement, presented the symptoms of melancholia.

Given thus, then, as a hypnotic draught, the chloral hydrate appears entitled to a high position in the future

lunacy practice. As the progress of recovery proceeds apace with the establishment of sound sleep, it is obvious how, as a therapeutic agent, its effects must be, in a very large degree, curative and remedial. This remark applies to attacks of acute disease. But surely, in the chronic insane, that mental agony produced by the constantly-returning presence of delusive voices and visions in the long nights of maniacal clamor and excitement, is an object scarcely less worthy of attack and of relief than is the sensation of pain in those who are of sound mind. The collateral happy results of this artificial rest are not to be measured except by those who are themselves the nervous, timid, and excitable neighbors of patients whose constant habit it has been to "make night hideous" by their cries.

The eleven cases recorded here are selected as being some of the earliest which were used to test the efficacy of chloral hydrate in this asylum; but it has been largely employed in a great number of other cases, including some of acute mania, of hysteria attended with suicidal impulses, and of general paralysis, accompanied, as it so often is, with dangerous and distressing restlessness. It is an anxious matter to remove a suicidal patient from a dormitory to a single room, because, in the latter, with all the means at our disposal, a patient, bent upon self-destruction, might probably concoct a plan to compass the ghastly purpose. A medicine which will enable such a patient to pass tranquil nights among watchful neighbors in an associated room is one whose precious service cannot be over-estimated."

Twenty-five or thirty grains were generally sufficient, but in one instance sixty grains were given, when the woman's reputation for noise became practically lost. His attempts to substitute chloral hydrate for morphia as a partial sedative during the day were unsuccessful.

I may take this opportunity of stating that three or four deaths have been lately recorded in England from overdoses of this medicine, taken in, I think all the instances but one, by patients on their own responsibility. One case was that of an eccentric old clergyman, who ordered in his chloral as he would his wine, by the dozen, and took both too freely.

Next in order I shall give abstracts of a few remarkable cases of affections of the nervous system that have recently been communicated to our different medical societies.

Dr. Gray, physician to the Radcliffe Infirmary, at Oxford, has reported a case of a very rare nature in which *unilateral anaesthesia without impairment of motor power* occurred suddenly in a man, W. B., aged sixty-two, with heart-disease. Ten weeks before his first visit as an out-patient, while stooping to pick up a piece of wood, he suddenly experienced a painful tingling sensation in the right hand, foot, and side of his face. In the face the smarting was so severe that he thought he must have been stung by a bee. On drawing his hand across his face to wipe away the supposed bee, he found, to his surprise, that over the right half of his face, exactly up to the middle line of nose, lips, and chin, the skin was insensible to the touch. There was no headache or other cerebral symptom. After a few hours the foot quite recovered. At the end of two or three days the right hand and cheek ceased to tingle and smart, but did not regain their sensibility, and have not done so since. From the first there has been no loss of power in the affected parts.

On the occasion of his last visit (February 11th), his condition was noted as follows: The palm and dorsum of right hand have their natural feeling, but, from the root of each finger to its tip, ordinary tactile sensibility is lost. A prick or pinch is felt, not as such, but as a scald. Their sensitiveness to heat or cold is exaggerated. Their electro-sensibility not tested. He can grip as strongly with this hand as with the other, but cannot use it for any delicate operation. Thus, in picking up a pencil from the table, the fingers fumble clumsily, and have to be guided by his eyes. Precisely the same phenomena of impaired and perverted sensation exist on the right side of the face, within the following limits, viz.: forward, as far as mesial line of nose, lips, and chin; upward, along the lower and (in less marked degree) upper eyelid and mid-temple; backward, to the anterior edge of the ear; and below, to about the lower edge of the ramus of the jaw. Beyond these limits—i. e., over forehead, scalp, ear, back and side of neck—sensibility is normal. The right conjunctiva also is normally sensitive.

In the right half of the cavity of the mouth, common sensibility, and in the corresponding half of the tongue both it and the sense of taste are almost wholly lost. During meals, from this not feeling the food between the tongue and the right cheek, a little food and drink often escapes out of that corner of the mouth. Sight and hearing on the right side are unimpaired. It is doubtful whether the sense of smell is as acute in the right nostril as in the left. Speech and deglutition are normal. He has full control over all the facial muscles, and perfect symmetry exists between the two sides of the face, whether its muscles are still or in action.

He is a strongly-built, healthy-looking laboring-man, and he declares he never had a day's illness in his life, but auscultation reveals considerable hypertrophy of heart, with disease both of aortic and mitral valves; and it is conjectured that embolism may very possibly account for the loss of function which has occurred in certain sensory ganglia.

At the meeting of the Royal Medical and Chirurgical Society, held on April 14th, Dr. Silver read a very instructive case of *retrogressive labio-glosso-laryngeal paralysis*. The patient, W. G., was a man, aged fifty-three, by trade a carriage-mith, twice married, and temperate. He had been generally healthy, but in his history there were certain facts pointing to syphilitic infection. He had previously been an in-patient at the Middlesex Hospital for incomplete right hemiplegia and left facial palsy, with difficulty and indistinctness of speech. He was gradually recovering, when he was again seized, and brought to Charing-Cross Hospital, where he was seen by Dr. Silver. On the morning of January 5th he was able to swallow his breakfast, and to speak indistinctly. By noon on the same day he could neither speak nor swallow; the right corner of his mouth was drawn downward, and an abundant tenacious saliva flowed from it. When admitted, his right eyelid drooped, and his mouth was dragged over to the right side; his lips were thick and blubber-like; and from the depressed corner of his mouth flowed an abundance of thick, viscid saliva. He could not close his mouth, even imperfectly; he could not protrude his tongue beyond his teeth. There was some degree of paralysis of the soft palate, for his respiration was snorting;

but food or drink did not regurgitate through his nose. His intelligence was perfect, but when asked to speak, only the rush of air through the open, powerless larynx could be heard. He had complete command over his limbs; he could lift both legs off the bed, and smartly withdrew either when the sole was tickled. His senses were perfect, but dull. His bowels were obstinately confined. His breathing was very imperfect and shallow; the respirations 36 a minute; the pulse 120 and very feeble. His appetite was unimpaired, and his power of taste uninjured; for a time he was fed solely by the stomach-pump. Notwithstanding the quick pulse and rapid respiration, his temperature for long remained at 97° degrees in the axilla. The breathing was mostly abdominal, but there was slight action of the intercostal muscles. Expiratory power was most deficient. From the period of his admission up to the present time the patient has continued to improve in every respect. As to treatment, iodide of potassium was given in scruple-doses three times a day. Occasional blisters were also applied to the back of his neck; and latterly localized electrization was employed to exercise the paralyzed muscles, which responded to the stimulus with unusual facility. The case was called *retrogressive*, to contradistinguish it from the *progressive* form of the malady, to which alone Duchenne would limit the name of *true* labio-glosso-laryngeal paralysis. This form tends to get well, while that referred to by Duchenne ends invariably in death. The name is the more appropriate, as the case in many respects closely resembles one of the progressive variety read backward. The state of this patient seemed, when first seen, identical with that of one suffering from the progressive form of the disease just before its fatal termination. At any moment the patient might be carried off, as if the case were progressing; but, the tide once fairly turned, there was a chance of recovery, however gradual. These different morbid conditions evidently depended on lesions of certain nerve-trunks or roots. Thus the paralysis of the lips would imply paralysis of a portion of the facial on both sides, but this nerve was apparently more affected on the left side than on the right, since the mouth was drawn to the latter. Again, the paralysis of the muscles of mastication implied loss

of power in the motor branch of the trigeminus. The paralysis of the tongue—that is to say, his inability to protrude it beyond his lips—would imply paralysis of the hypoglossal. The inability to swallow, and the respiratory and cardiac complications, pointed to the implication of the vagus; while the loss of voice was due to paralysis of the cerebral portion of the spinal accessory. It so happens that one section of the medulla oblongata made and figured by Dr. Lockhart Clarke illustrates this to a nicety. In it are displayed the hypoglossal and spinal accessory springing from their nuclei, and lying between those and the central canal, the cut band of fibres constituting the long root of the facial. Injury to the medullary substance at this level would inevitably occasion more or less loss of voice, both as regards articulation and phonation, with paralysis of the orbicularis oris. Higher up, where the hypoglossal nucleus has almost disappeared, there is to be seen another descending band of the facial, at this level greatly increased in bulk. This new band constitutes the descending, or motor, root of the trigeminus, which, speaking broadly, presides over the muscles of mastication, and which (for it has been traced downward to the level of the lower portion of the olivary body) is thus brought into exact accord with the facial and hypoglossal. At first, the most dangerous symptoms were cardiac and respiratory, and this imperfect action of the heart and lungs is exactly what follows section of the pneumogastriæ in one of the lower animals. Their inhibitory action on the heart is thus removed. Here, therefore, the nerve affected would seem to have been the vagus, and that, too, at its nucleus rather than in its course. Finally, as to the saliva, a partial paralysis of the corda tympani, and a withdrawal of its influence from the sub-maxillary gland, might, by overturning the normal balance between it and the sympathetic, produce a flow of thick and tenacious instead of normal saliva, and so relegate the phenomenon to the same site as the others—that is to say, a minute space on the floor of the fourth ventricle and upper portion of the medulla oblongata.

In the discussion that followed the reading of the paper, Dr. Broadbent remarked that, accepting generally Dr. Silver's

admirable demonstration of the seat of the lesion, he considered it probable that it involved an elongated longitudinal tract along the middle line at the back of the medulla, rather than a limited transverse segment. The nuclei of the motor nerves involved — the spinal accessory, hypoglossal, facial, and motor division of fifth (the last more deeply situated) succeeded each other from below, upward, around the spinal canal, and alongside the middle line of the floor of the fourth ventricle, and he did not see how they could all be implicated at any point, especially without affection of some sensory nuclei laterally situated at the same level in the medulla. It was more difficult to decide what was the nature of the morbid change; it could not be degeneration, since the patient was recovering. The probable alternatives were, as Dr. Silveira had said, hæmorrhage and syphilis, and each presented difficulties. Possibly there might be a small blood-clot in the upper end of the spinal canal and in the groove along the middle line of the floor of the fourth ventricle.

At a recent meeting of the Clinical Society of London, Dr. Broadbent read notes of a case of *paralysis of the ophthalmic and superior maxillary divisions of the fifth nerve, of the fourth nerve, and of the branch of the third to the levator palpebræ on the right side*, from syphilitic disease at the base of the cranium. The interest of the case consisted in the rarity of paralysis of the fourth nerve, and in the illustration of anatomical diagnosis furnished by the simultaneous implication of this nerve and of the two upper divisions of the fifth. The patient, a farrier, aged forty-one, became an out-patient at St. Mary's Hospital on May 9, 1870. He had been ailing for eight months, and under treatment nearly all that time. At first he had had pain in the right side of the head, worse at night, and for four months had had loss of sensation in the right side of the forehead and face, together with ptosis and double vision. The skin of the entire region of distribution of the ophthalmic and superior maxillary divisions of the fifth nerve was insensible to all kinds of impressions. The eyelid could be raised only to a slight extent by the action of the occipito-frontalis. But, though the double vision was very

marked, there was no perceptible squint, and the pupils of the two eyes were equal. On more careful examination, it was found that the two images were not on the same level, one being below and to the right of the other; and subsequently, by causing the patient to look at an object in various ways, so that the eyes were successively directed upward, downward, to the right and to the left, it was clear that the double vision was due to paralysis of the fourth nerve, the two images receding when the eyes were directed downward, approaching each other when they looked upward, the pseudo-image going far to the right, but coming to near the level of the image proper when the patient looked to the right, getting immediately beneath it when he looked to the left. There was no acknowledged syphilitic history, but the sallow, earthy complexion of the patient, a tubercular eruption near the right eyebrow, and facts in his family history, were considered conclusive as to the syphilitic origin of the disease, and iodide of potassium was given in doses of six grains, quickly increased to twenty grains, the result being rapid disappearance of all the symptoms. The lesion was supposed to have been a node or gummy tumor of the fibrous structure surrounding the ophthalmic and superior maxillary divisions of the fifth nerve, in that part of their course between the Casserian ganglion and the exit of the latter through the foramen rotundum. Here the fourth nerve lies close to the ophthalmic, and sometimes joins it, so that a single lesion would cause the loss of sensation and the double vision; it does not, however, appear how it could give rise to the ptosis.

The reading of this paper was followed by a prolonged discussion, in the course of which Mr. Carter observed that the pain associated with paralysis of this nerve was due to the vertigo and the position of the head, and that it might be relieved by the use of prismatic spectacles. Mr. Hulke said that in most orbital syphilitic affections there was no history of secondary syphilis, and referred to the tendency of these cases to recur. He had seen a woman in her fifth attack. The vertigo, he thought, was a good-enough test for this form of paralysis. Dr. Anstie noticed the frequent connection between deep ulceration of the tongue and this form of paralysis. The

President (Dr. Gull) and Dr. Broadbent referred to the peculiar smell about people affected with tertiary syphilis and paralysis. At a meeting of the Pathological Society, held on March 21st, Dr. Clapton exhibited a specimen of *atrophy of the cerebellum*, occurring in a married woman, aged thirty-three. "She was suffering," he said, "from pleurisy, with extreme prostration. The abdomen was hard and distended, but there was no indication of pain on pressure. Her manner was peculiar. She would answer questions promptly, but not rationally. She could not recognize her friends. Her hands were very tremulous when moved, and she was unable to feel herself. Pulse very frequent and feeble. Breathing short and rapid. She had been married a year, and was confined a month previous to admission; was said to have been very delirious for a day or two after her confinement. She died nine days after admission. An hour before death she startled the nurses by suddenly rising and manifesting a considerable degree of muscular strength. There were no convulsive movements. Her husband informed me that he was only acquainted with her a short time before their marriage. She could not take long walks, but was obliged to walk slowly, and during her pregnancy her gait was very unsteady. She was somewhat dull of comprehension, but could read and write, and carry on all her domestic duties very fairly. Her brother informed him that as a child she was very backward in intellect and delicate in health, and that she was unable to walk at all until six years of age, and up to fourteen could not guide her hands to her mouth, so that she was obliged to be fed. Her mother stated that up to the age of four her daughter was a very healthy child; that at that period she was attacked with measles, after which she was unable to walk or talk for months; that from that time up to the age of fifteen she walked unsteadily, and was not able to use her hands with ease and certainty, and that she was of dull intellect. With regard to the theory which assigns the cerebellum as organ of sexual instinct, I may mention that, according to her husband's account every thing was perfectly normal in relation to her generative functions. A careful examination of the cerebellum was made by Mr. C. Stewart. The weight

entire brain was 38 ounces, and of the cerebellum 710 grains; the average weight of the brain in the female being 44 ounces, and of the cerebellum 2,200 grains. The weight of the atrophied cerebellum is consequently less than a third the normal. Its transverse diameter was three inches, the average being about four inches. This would correspond with a reduction of cubic contents from five to three. The base of the skull was, without any increase of its thickness, accurately adapted to the under surface of the brain. The cerebrum appeared of normal consistence, but the cerebellum was extremely hard, with the exception of a narrow area in front of each lateral lobe, which, both to the naked eye and under the microscope, appeared normal. The blood-vessels were healthy. A section extending from the surface to a point a little below the ganglionic layer showed, under the microscope, an almost complete absence of proper nerve-substance, with great increase of the neuroglia (*sic*); also spherical, transparent, and apparently homogeneous bodies.

Among the most important recent English additions to our works on insanity and allied topics I may notice Mr. Gardiner Hill's "Lunacy, its Past and its Present;" Dr. Bateman "On Aphasia, or Loss of Speech, and the Localization of the Faculty of Articulate Language;" and Dr. Blandford's "Insanity and its Treatment: Lectures on the Treatment, Medical and Legal, of Insane Patients."

Dr. Gardiner Hill's book is written with the view of asserting his rights, respecting which "some unjust and ungenerous criticisms have lately appeared," to be considered the true founder of the present non-restraint system. The evidence adduced in the appendix seems to be conclusive in Dr. Hill's favor. As his work was published fully a year ago, he can hardly claim a detailed notice in a letter on the most recent discoveries in the treatment of mental diseases.

The same objection, I regret to say, applies to Dr. Bateman's very instructive and interesting volume. It not only appeared a year ago, but it had been previously published in detached parts in the *Journal of Mental Science*, where it attracted great attention.

In case this essay should have escaped the attention of your readers, I may briefly mention what are its scope and object.

The author has collected all the evidence at his disposal bearing upon the various theories which assign the *seat of articulate speech* to this or that portion of the brain.

He first gives the literature of the subject, as exemplified by the French, German, English, and American writers, and then the result of his own clinical experience.

After mentioning the various forms in which *loss of speech* is observed, he puts under contribution physiology, comparative anatomy, chemistry, etc., and, as he finds so many exceptions to all the theories about the *anatomical seat of speech*, he ventures to affirm that, at present, science has not traced speech to a "*material centre*;" and that speech, like the soul, may be an attribute the comprehension of which is beyond the limits of our finite minds.

If this be true, and speech cannot be traced to a "*material centre*," here, according to Dr. Bateman, is *the* barrier between man and animals, and the Darwinian argument of the analogy between the brains of the ape and man loses its force.

Without entering into the question as to how far Dr. Bateman has succeeded in controverting Mr. Darwin's view, I shall proceed to notice Dr. Blandford's lectures. As they were simultaneously published in America and in England, there is the less reason for my entering at any length into the value of Dr. Blandford's labors. The first two lectures are devoted to the organ and the phenomena of mind; these are succeeded by two on the pathology of insanity in its different forms; while the morbid appearances, the causes, and the symptoms of insanity are each discussed in a separate lecture. The forms of insanity which specially interest the physician are then considered, from acute delirium, which Dr. Blandford puts at one end of his list, to acute primary dementia, which he places at the opposite extreme—in the one there being a great excess, and in the other a corresponding defect, of brain-action. The lecture treating "of patients whose insanity is doubtful" is, perhaps, for the student, one of the most valuable in the book; and every young practitioner would do well to make himself thoroughly master of the facts touching the law of lunacy, and of the mode of examining patients, which form the subjects of the last two lectures.

Among the special features of this book, which is unquestionably our best manual on the subject, I may mention his view that in the so-called moral and emotional insanity there are always to be found intellectual alterations, although they may not take the form of delusions (see p. 306, etc.); his enumeration of the forms of certificates, and his directions regarding the examination of patients, to which I have already directed attention.

ART. IV.—*Aphasia*. By SAMUEL HENRY DICKSON, M. D., LL. D., Professor of the Theory and Practice of Physic in the Jefferson Medical College, etc.

IN the April number of this JOURNAL is preserved a very valuable, nay, almost exhaustive clinical lecture on this interesting subject by Prof. W. A. Hammond, in which are maintained with great force and earnestness the propositions—1. That there exists a special faculty of speech or language; 2. That it has a “special part of the brain appropriated to it” as its organ; and 3. That the location of this organ has been discovered and so clearly made out, that we may look upon it as one of the established facts of physiology that the seat of the intellectual power of “expressing ideas by language” resides in “the posterior part of the third convolution of the anterior lobe of the left side . . . in the immediate vicinity of the fissure of Sylvius, in that region nourished by the middle cerebral artery.” These views are urged with no little ingenuity of argument, and illustrated by the wide wealth of observation and reading, and the minute research, which characterized the lecturer. Nevertheless, I cannot but regard them as incapable of being proved, and untenable; and shall proceed to show the reasons for which I would decline to admit them among our psychological and pathological doctrines.

The great cerebral ganglia are assumed to control the separate and distinct powers of thought and motion. We are agreed to regard them, in mass, as the seat certainly and probably the organ of all intellection—perception, conception, ratiocination, emotion, passion, memory, “whatever stirs this mortal frame.” Distinguishing the above-named and many

more mental processes from each other, we have very naturally been led to the distribution of them, or the actions by which they are effected, among different portions of the nervous substance, and thus arose the so-called science of phrenology, from which, in the hands of Gall, and Spurzheim, and Combe, we have learned so much that we retain and preserve among our permanent treasures, while we regard the craniological maps drawn by these illustrious philosophers as the mere records of an unsubstantial dream, and, as we think of alchemy and astrology, the chaotic beginnings of the grand sciences of astronomy and chemistry.

Nothing can be more reasonable or praiseworthy than we pursue these inquiries; nothing more deserving of applause and encouragement than the analogous zeal of pathologists in seeking to establish a connection between lesions occurring in the great masses coincidently with the numerous diseases manifesting themselves by disorders of thought or motion and the diseases themselves, and so tracing the instructive causative relation, naturally suggested by the coincidence. We might almost venture to measure the sincerity of devotion to our divine art of healing professed by its cultivators, as proved by the intensity of their curiosity, their anxious zeal in the study of pathological anatomy, morbid changes of structure in the delicate and complex organism, liable to so many and such obscure aberrations. It must be confessed, however, that thus far our researches in this direction have not been very successful or satisfactory.

Casper, the most experienced perhaps of necroscopists, gives an emphatic warning against presumption in deciding upon the causes of death when making *post-mortem* examinations for judicial purposes. We often see deaths without *any* apparent, often without apparently *adequate* cause; we meet with violent injury of so-called vital organs, the subject surviving. "Cases very frequently occur," says the erudite author of this great work on "Forensic Medicine," vol. i., p. 56, "in which the most careful examination of the body can discern no material alteration that has any reference to the cause of the individual's death. Instances of this kind, as I have often seen, terribly perplex the inexperienced. Nothing abnormal on the

surface of the body, nothing in the cranial cavity, nothing in the thorax, nothing in the abdomen! Of what did the deceased die? That the cause of death cannot with certainty be determined—this decision is in itself perfectly indisputable.” It is, indeed, as difficult to decide in occasional examples why and how a man came to his death, as to pronounce on the mode of destruction of a wrecked ship from the condition of the fragments cast upon the shore after a storm.

There is surely, then, reason to conclude, *a fortiori*, that, in the present state of our science, we are emphatically liable to error in fixing upon special morbidities of structure, as indicating the primary seats of diseases, and as giving rise to particular symptoms occurring in their course. Our knowledge—and I am glad to say it—is ever changing and progressive. Physiologists have not settled positively the uses of certain large viscera, as the spleen. The liver does or does not make sugar; perhaps may form urea, once thought to be set apart unquestionably by the kidney; and may eliminate or secrete, as the case may be, or merely convert into stercorine the effete element cholesterine. We know not, as pathologists, where and how fevers begin; we are in doubt as to the origin of diabetes; we do not venture to regard a part of the brain as the organ of sugar-formation because the urine shows saccharine qualities when the floor of the fourth ventricle is irritated; epilepsy, brought into existence traumatically by Brown-Séquard, is not, therefore, imagined to be causatively or essentially connected with lesions of the spinal cord.

There would seem to be peculiar caution necessary in the investigation of maladies of the great cerebro-spinal axis, because of the absolute want of appreciable adaptation of structure to function here. Whatever we may say of motility as belonging to phosphuretted fat and albumen, we cannot hesitate with Tyndall to acknowledge that such origin of intellection “is not *thinkable*.” Yet phrenologists] audaciously arranged the minute details of appropriate relation of nicely-defined organ to specific function; and pathologists, not deterred by their utter failure, or at best most imperfect and questionable success, have followed them in the analogous attempt to assign a special place and mode of disease of brain as the seat and cause of certain phenomena.

I have alluded to the universal admission that insanity all its varieties, all mental aberrations, are dependent upon and properly attributed to cerebral disorder. Yet, I believe that no physician will hesitate to acknowledge that we have not, thus far, succeeded in establishing an undisputed connection between any known form of lunacy, delirium, or dementia, with any recognizable alteration of structure of any definite portion of the cerebral mass. Nay, instances have occurred in which insanities of diverse character have existed without any discoverable lesion or disorganization; and, *vice versa*, examples of cerebral lesions long existing while the mental powers seemed unimpaired. Perhaps we shall by-and-by attain more exact and available means of examination and detection of obscure changes now unperceived; but for the present we must be governed by the accepted rule—*ole non existentibus et non apparentibus eadem est ratio*.

I will give here a thinking instance of this negative infliction from Wingett's Report of Dundee Lunatic Asylum, to be found in *Winslow's Journal* for July, 1857. The subject was an epileptic imbecile: "His mind was a blank for six years; he never uttered a rational sentence, nothing but difficult articulation of a broken, disjointed jargon; his movements were unsteady and ill-balanced. But the epilepsy, together with the total destruction of the mental powers and the impairment of the volitional movements, left no impression behind them appreciable either to microscopical or other means of detection. *Post-mortem* examination failed to reveal any departure from the ordinary structure of the nervous apparatus."

Of the opposite class of cases in which cerebral maladies, even when impairing motility, left intellection seemingly undisturbed, we shall find examples in Watt, inventing the most complicated machines while suffering intensest headaches; hemiplegics declaiming eloquently at the bar and in the pulpit, and transacting successfully the most complicated business; and, if the stories are true, Alfred the Great, Cæsar the Greatest, and Napoleon, intellectually little inferior to either, pursuing the loftiest paths of ambition under the burden of epilepsy.

I accept readily Prof. Hammond's definition of aphasia, exclusive and inclusive, as "the loss of the ability to express ideas

by language either from forgetfulness of the words to be employed, or from lack of power so to coördinate the muscles of speech as to articulate them when remembered." This brief distinction into amnesic and ataxic is well conceived and convenient, and deserves, I think, our special attention. In the treatise upon "Softening of the Brain," contained in Reynolds's "System of Medicine," the successive steps by which the medical profession has been led to the opinions now widely received on this subject are succinctly traced. They have grown out of the unstable soil of phrenological speculation. Gall, maintaining the existence of a separate "faculty of language," assigned it a place in those portions of the anterior lobes of the brain which lie upon the supra-orbital plates. Bouillaud accepted this dogma unequivocally, and endeavored to show that lesions of the anterior lobes and such lesions exclusively occasioned impairments of the faculty of speech. Neither Gall nor Spurzheim nor Bouillaud intimated that there existed any difference in this regard between the right and left side of the head. The next step was taken by Dax, who pointed out, as the result of numerous observations, that such disturbances of the faculty were always related to lesions of the left hemisphere, and never to those of the right. Repeated coincidences, noted from time to time, have confirmed the position of Dax, while a few apparent exceptions have been recorded. The statement would now be made in language somewhat less exclusive. Thus stood the matter in discussion for many years, when Broca came forward with the still more definite announcement that the exclusive seat of the faculty of articulate language is in the second and even more especially in the third frontal convolution of the left anterior lobe of the brain. Dr. Hughlings-Jackson, investigating the question with minute precision, not only arrives at conclusions in accordance with those of Dax and Broca, but has discovered and described the anatomical character of the lesion which most frequently produces aphasia or aphemia, as "the plugging of the middle cerebral artery on the left side by an embolus derived from valvular disease of the heart." In his treatise "On Apoplexy and Cerebral Hæmorrhage" (Reynolds's "System of Medicine"), he widens somewhat his circle of causation. "It is with this

sort of paralysis," he says, "that defects of speech occur, as the lesion nearly always, besides involving part of the left corpus striatum, extends to or actually destroys the gray matter of certain convolutions near this motor centre. M. Broca thinks the disease usually involves the hinder part of the third left frontal convolution, and there is no doubt that it is nearly always—always in my experience—in this region."

Prof. Hammond adds to this history the suggestion so important to a discriminating apprehension of the purport of the collated facts, as to the different character of the cases affecting different portions of the cerebral tissue attacked. Jackson speaks of the lesion of the corpus striatum—a *motor* centre. The brain, as we know, may be injured either in its motility or in its intellectional power, either apart from the other, and Hammond points this distinction instructively by his employment of the terms amnesic and ataxic. Thus we arrive at the announcement of the hypothesis that the memory of words may be separated from the power to utter them articulately, and, as the latter, a motive ability, resides in the corpora striata, we must fix the power in the third convolution of the anterior lobe at its posterior part. In the debate that followed the reading of Prof. Hammond's essay before the New York Pathological Society, we find reported some interesting remarks by Prof. Dalton, so ingenious and apposite that it is greatly to be desired that he should undertake a thorough investigation, psychological as well as physiological and pathological, of all the questions comprised in this intricate inquiry.

Far be it from me to depreciate the value of any form or variety of knowledge, but it seems irrelevant to search into the morbid changes of tissue or structure of the brain, with the expectation of finding out the source or nature of disordered intellection. We may, and I hope will, clearly detect and diagnosticate the locality and character of organic lesions whenever concurrent with mental derangements. We may, perhaps, in certain instances prevail in setting apart the ataxic or physical aphasia from the intellectional or amnesic. We find, as I have already acknowledged with Tyndall, that the connection of consciousness with material substance is among subjects "not thinkable," not within the reach of our under-

standing. On the other hand, we see matter always in motion, and find no difficulty in comprehending, though even this in a vague way, cerebral motility

It is a rash conjecture to localize the memory of words, when we are so little prepared to appreciate this power or faculty in its general sense, or to say where it resides or what may be its nature or mode of action. It exists both independently and also in some degree under the control of the will; but we know not where to look for the seat of volition, nor how to regard its influence either in arousing, or restraining, or coördinating bodily or mental action.

There appears to me to be no little temerity in assuming a *causative relation* to exist between the indicated lesions of the brain noted in aphasic subjects, and the coincident abolition of speech. If a single instance can be found in which there was this loss of utterance without the concurrence of such lesion, it will be proved not to be indispensable—not a *verue causa sine quâ non*. And, again, if morbid alteration of structure be detected in this region without aphasia, we shall know that it is not the *causa causans*, adapted and sufficient for the effect.

Temporary loss or suspension of memory of words, nouns, names, is not an uncommon experience with any of us in our usual health. Slight ailments of most transient duration produce such impairment very often; it would be rash to ascribe them all to changes in the left hemisphere. A marked instance of this sort is so well related by my friend, the father of the subject, and a very intelligent physician, that I will transcribe it in his own words. It is a description of one among several similar attacks: "While standing before the glass in the morning, in my presence, combing his hair, I asked him a question, to which he made no reply, and, on my repeating it, still remained silent. Somewhat offended, I left the room and he followed me. I returned immediately, and he was again at my back. When I stopped he came round me in front, and, looking me in the face, pulled my coat to attract my attention. Not until then did I suspect his situation; now I placed him in bed, and in less than a minute it was over, and he was restored to his speech. He says that he was perfectly in his senses at the time, and recollects all that was said or done."

We have, on the other hand, numerous examples of apoplectics, recovering partially with hemiplegia of the right side, who enjoy perfect freedom of speech. A familiar acquaintance of my own, a paralytic of many years, has maintained his high position as a popular preacher of great fluency and eloquence. It is too much to take for granted that in all such cases the corpora striata and the lower convolutions of the left or the right hemispheres have escaped intact. We read of Dr. Samuel Johnson, that feeling himself palsied, he had the presence of mind and good sense to try his condition by reciting the Lord's Prayer, his ability to recall the words very reasonably cheering and consoling him.

Let us inquire what is meant by the phrase, a "faculty of speech." All animals appear to enjoy some means of communication with each other, effectual and satisfactory. Speech—articulate utterance of sounds—so far as we know, belongs to man alone. In the mysterious consultations which take place among ants and bees, it is not impossible that some form of language may be used unappreciable by our coarse senses, whether addressed to the eye as in our hieroglyphs and writing, or to the touch, as between Laura Bridgman, deaf-mute and blind, and her friends, teachers, and associates. If the mere power of uttering articulate language constitutes a faculty of speech, we must share it with Sterne's starling in his prison, with the magpie and the tribe of parrots, macaws, and cockatoos. Nay, we cannot deny it to one quadruped at least, who satisfied the great philosopher Leibnitz with his pronunciation of several words. As this dog was also a German, some of these utterances must have been hard, difficult, and guttural. I shall not insist upon the credibility of the stories told us, of the rational employment of phrases, asserted of some of the birds, Major Kelly's parrot among the rest. But, whether they know the meaning of the words or not, it cannot be doubted that they possessed the organs that willed and coördinated the action of the muscles by which we enunciate distinctly, and the memory of words and of significant phrases.

There is, in the progress of human development, nothing that appears more arbitrary and capricious than the connec-

tion established between words and thoughts, employing the last term in its widest application. One would reasonably expect that a "faculty" inherent in the race of men, intuitive, would manifest itself in all the several tribes in modes similar or analogous, the organic structure being in all the same. But how strange the reverse! and how little in common between the ancient Sanscrit, the rich Greek, and the abounding English, and the speech—if we may so call it—of the hordes of savages who grunt, croak, and ejaculate their crude communications! So far is this anticipated uniformity from being the rule, that philologists fearlessly infer ancestral connection and hereditary transmission, or at least long-continued and close intercourse, from the concurrence of any considerable number of the most elementary sounds used significantly or expressively.

A curious confusion may be traced in the writings of some of our authorities on this subject. Thus, Reynolds philosophizes: "Talking, walking, and writing, are each of them very complicated processes, and are in man the result of education." It is not clear why he has not included here reading also and arithmetic. That a well-formed child would walk when it grew up, if we can suppose it to grow up under circumstances which prevented its seeing the motion performed; that it would restlessly creep, roll, raise itself by the aid of its hands upon its lower limbs, fashioned as if for the express purpose of supporting it; that it would totter, stagger, catch its balance, and so learn to stand, leap, run, and walk, I think every one would anticipate. But would it talk? Probably not; unless it heard others. Imitation and education do a great deal for the young creature, though not all. The blind child soon prattles in its mother-tongue, the innate power being brought into action through the ear. The deaf-mute also learns to speak, more slowly and imperfectly, by watching the muscular motions of his sagacious and indefatigable teacher. The first efforts of both are mere mimicry; but the general intelligence soon enables them to connect the sound and the thought in fixed association by repetition and repetition only. Now, it is by such repetition acting upon the special power of imitation that the parrot is taught to speak words of any language, and birds to

sing tunes. Why is it that with the apparatus for speaking and the capacity of understanding a great variety of familiar signs, and even of imitating them closely, we find the ape persistently dumb? The cockatoo possesses and exhibits the memory of words and the power of coördination in their distinct utterance and articulation. But its defects of structure give its speech a resemblance rather to ventriloquism than to ordinary human enunciation. We would expect, *a priori*, from the flat thin tongue of the monkey and the dog, so much more like man's than the thick organ of the parrot, and from their lips, so much more flexible than the beak of the bird, a readier and more easy attempt to pronounce or imitate sounds of which, it is clear, they have learned the meaning. Something, however, is wanting here to the higher intelligence of the quadruped. If we look into the brains of these creatures we shall not find any arrangement of convolutions or circulation which shall explain the difference. We are told, indeed, that the cerebral structure of the higher apes is closely similar to that of man, even in the number of convolutions; and it is not asserted that the talking birds differ in this respect from those to whom speech is denied.

Having refused to acknowledge a separate faculty of language, I am not disposed to enter with any zeal into the effort to find for it a special and distinct organ among the masses of the hemispherical ganglia. But the brain as to its motility may fairly be explored with good hope of discovering the local origin of certain movements, those which effect articulation of vocal sounds among them. Therefore, I will concede the possibility of determining a connection between the ataxic forms of aphasia and of agraphia as well, and certain local lesions, and the further possibility that these latter may stand in a causative relation to the obvious phenomena. There will be, however, great difficulty in establishing such a relation, on account of the intimate interfusion of the intellectual and motor or physical functions and actions, and in making the requisite diagnosis.

These difficulties are acknowledged by Reynolds, who says somewhat irrelevantly and abruptly: "We cannot yet assert what is the primary loss in the condition of ataxy or of writer's

cramp; (!) neither can we do so with any accuracy in regard of phasia." From Hughlings-Jackson, also, we have the admission, apparently inconsistent with his assignment, above given, of a particular locality and mode of lesion, that "the subject of defects of language has to be discussed with the physiology of mind and movement, and with the anatomy of the brain, and not in connection with any particular sort of damage, such as cerebral hæmorrhage:" he acknowledges further the importance of distinguishing between "a general confusion of mind, and that more psychical loss which occurs with, or constitutes defect of expression, loss of will, and of which the most prominent sign is inability to talk, or to talk well—*phasia*."

If language were not, as many believe, a positive revelation to newly-created man, how many generations of our race, primitive and prehistoric, must have existed before language was developed! In the "struggle for existence" he must have talked, and climbed, and fought, thousands of years before he invented words, or hieroglyphics, or letters. How widely diverse, too, do we observe the modes to be in which the several tribes sought to embody and give expression to their thoughts, ideas, wishes, wants! Some of the languages still in use are scarcely articulate. In many hordes of savages the formation of letters is unknown, and in some even picture-signs seem to remain undiscovered or unemployed.

The attempt to allot special functions of memory of words and of muscular coördination for their utterance would seem to be utterly foiled by the prodigious variety, irregularity, and eccentricity, of the phenomena presented in the several cases. Many of these seem to permit of no arrangement, or classification, or explanation, any more than the vagaries of dreams, or of epileptic delirium, or the hallucinations of *mania a potu* or *hysteria*. Let us recite a few of these: Many years ago I published a brief history of an apoplectic patient, who, after a time, recovered very well his physical health and muscular strength, but continued long to labor under some mental or psychical difficulties of curious and obscure character. He seemed to lose very often the conventional relation between an idea and the word denoting it—an English word, of course

—as he spoke no other language. [Has the inquiry ever been entered into, whether memory of one set of words may be retained by one who is familiar with several languages and that of other sets abolished? It would be interesting to be informed on this point. I have somewhere read of Mezzofanti, the great polyglot scholar, that, after an attack of fever, he was for a time oblivious of all but his native tongue.] My patient would sometimes speak an entire sentence without hesitation; but there were particular words which seemed to have been obliterated from his vocabulary. He could always read them, however, pronouncing them fluently when held before his eyes. One word especially he could never recall, nor could he be brought to utter it, or accept its suggestion orally; and this continued far into his convalescence—indeed, as long as he remained under my observation. He was very fond of *molasses*, which constituted, with water, his usual beverage; but was obliged to have it written on a card, which he always carried in his pocket, and was much chagrined at the often-recurring necessity of taking it out, as his servants were ordered not to obey any hints or gestures, but to wait till he spoke for it, which he could not do without looking at the card. He read much; but if a sentence was a long one, complained that he could not understand it, appearing to be unable to retain the first portion of it long enough to collate it with the conclusion; so in copying, which afforded him amusement, he wrote a good hand, and seldom failed to write the words properly, but, for the reason given above, seemed frequently to lose the meaning. It is remarkable that his recollection of numbers has always been clear, and that he reads them and speaks of them accurately and promptly. A date expressed in figures he could at any time make out, but boggled at words referring to day or month.

Feuchstersleben tells us, in contrast, a story of a soldier, who, having been trepanned with some loss of brain-substance, suddenly forgot the numbers 5 and 7, and was not able, until long afterward, to learn them again like a child. There are other cases on record of this separate oblivion and retention of numbers, which would seem to indicate not only a separate faculty, but a distinct organ of number as necessary. The same

erudite author offers us the most extraordinary of all partial or circumscribed examples of amnesic aphasia in "a learned man from whose memory a fever obliterated the letter F."—(See his "Medical Psychology," translated for Sydenham Society, page 239, quoted from Bencke.)

The son of a physician of New Jersey was kicked on the head by a horse. When he recovered from the injury, under the surgical treatment, he had forgotten the names of all his friends, though he recognized their persons. He evidently ignored all tastes and flavors, and all eatables he called "bread." When well enough to return to school he was found to have lost some of the letters of the alphabet, and some words. As to numbers, it is stated that "when an example was performed for him where he left off in algebra, his knowledge revives, and he can perform other examples without aid."

Dr. Hunton attended a youth whose skull was fractured as in the above case. "After some days he became anxious to communicate his ideas, but could not talk intelligibly, which annoyed and irritated him. He was unable to recollect the names of things. 'You know what I want,' he would say, 'give it to me.' He could describe so that they guessed at his wishes. It was months before his memory returned."

Sarah Wood, a paralytic, under the care of Dr. Hughes, of St. Bartholomew's Hospital, London, labored under "a morbid inability to associate the commonest things with their names. If one asks her to count 'five,' she gets on as far as two perhaps; then stops, makes an effort to say 'three,' but fails; on the slightest prompting she is delighted, and then renounces the numbers, 'three, four, and five.' When asked her name she is quite puzzled; she struggles most painfully with the first letter 'S' to say 'Sarah,' which one may read on the card over her head; but when a stranger repeats the word, her delight knows no bounds; and when we added the word 'Wood,' says Dr. Hughes, 'she got quite into ecstasies.'"

There is confusion enough in the phenomena here to make commentary difficult; but the next which I shall recite is more embarrassing. We have it from the high authority of Dr. Graves, of Dublin (see *Dublin Quarterly Journal of*

Medical Science, February, 1851): "A farmer, aged fifty-two years, had a paralytic fit in 1839. Since that time he has never recovered the use of the afflicted side, and still labors under painful hesitation of speech. He is, however, able to walk about, take a great deal of active exercise, and superintend the business of his farm. *His memory seems to be good for all parts of speech except noun-substantives and proper names*; the latter he cannot at all retain, and this defect is accompanied by the following singular peculiarity, that he perfectly recollects the initial letter of every substance or proper name for which he has occasion, though he cannot recall the word itself. Experience has taught him, therefore, the utility of having a written list of the things he is in the habit of calling for or speaking about, including the names of his children, servants, and acquaintances. All these he has arranged alphabetically in a little pocket dictionary, which he uses as follows: If he wishes to ask about a cow, he turns to the letter C before he commences the sentence, and looks out for the word. So long as he keeps his eye and finger fixed upon the written letters, he can pronounce the word in its proper place; but the moment he shuts the book, it passes out of his remembrance and cannot be recalled, although he still recollects its initials and can recur to it again. When he comes to Dublin to consult me, he comes, with his dictionary open, to the hall-door and asks to see Dr. Graves; but on one occasion, having forgotten his dictionary, he was unable to tell the servant what or whom he wanted. He cannot recollect his own name unless he looks out for it, nor the name of any person of his acquaintance, but he is never at a loss for a moment for the initial which is to guide him in his search for the word he seeks." Here we have clearly separated, not only the memory of letters and that of words, the latter being abolished, and the memory of noun-substantives and names, from that of "the other parts of speech," which last does not seem to have been impaired. Numbers we have already seen distinguished from words, and certain numbers and letters from other letters and numbers. It is hard to localize morbid conditions of parts of the brain, and so to circumscribe them as to account for these disorders and their exclusiveness.

From my note-book I make the following extract : " July, 1867. Dr. G. brings here to me his young wife, hemiplegic and almost dumb ; her right side is affected. She is twenty-six years of age ; was married in October, 1865. A year after, October, 1866, fell into labor at eight months ; was seized with convulsions, and was delivered of a dead child. She survived, paralytic, helpless, silent, almost comatose for several days, slowly improving as she convalesced into her present state. She has recovered in great degree the use both of her hand and foot, but she cannot talk. She speaks but one word, ' No.' This she utters clearly and distinctly—not another syllable. Her bright eye and expressive countenance seem to inform you that she understands every thing you say, and her pantomime appears to reply to you intelligently when you address her ; but her answer to every question, even when she evidently intends an affirmative, is still ' No.' She is quite cheerful, walks willingly and pretty well ; takes notice of interest in every thing that goes on about her ; looks curiously into the shop-windows, and helps in purchases made, urging her husband to take her on to see New York."

Dr. G. visited me again, October, 1870. He informs me that she became pregnant once more in 1868, and miscarried, with convulsions, at five months, dying a few weeks after. In the mean while he had taken her to the Rockbridge Alum Springs, Virginia. She had profited much in her general health by the use of the waters, but the aphasia had remained unchanged.

I conclude then that, in the present state of our knowledge, we may regard the brain as an excitor and director of motility, and so connect its morbid affections with all paralyzes and ataxic phenomena. But, as the organ or seat of intellection, memory, and volition, I cannot think of this great mass but as a unit, whose complex and intricate structure is as yet unravelled, and whose undivided and uncircumscribed parts act in harmony and indissoluble concert with each other. Each and every portion of it thinks, remembers and wills ; disorders of intellection, memory, and will, do not, of themselves, prove the fact of lesion of any definite portion of its structure, or any change in its composition ; nor can we infer from such phe-

nomena, except as mere conjecture, either the nature, the seat, or the extent, of the supposed injury.

ART. V.—*Taste, physiologically considered.* By GUY D. D. ALY, M. D., House-Physician to the Epileptic and Paralytic Hospital, Blackwell's Island, New York.

Now that the end and aim of life is universally recognized to be pleasure in its widest sense, it behooves us to inquire if there are any fixed principles by which our impulses after that end may be guided, or any foundation for criticism in matters of taste.

That philosophers have hitherto failed to determine accurately that which should regulate our sentiments of the beautiful need not be considered surprising, when we remember that they have totally ignored physiology in their investigations; hence the theories that have been advanced, attempting an analysis of the faculty of taste, have depended, rather upon contrasting the circumstances in which beauty occurred than defining the principles by which objects apparently the most dissimilar could consistently be said to exhibit beauty; although it is undoubtedly true that the pleasure we derive from the investigation of the laws of nature, the contemplation of a work of art, or a sensual gratification, is different in each instance; yet it is susceptible of proof that the principles through whose action they are severally made pleasant is in all cases the same; hence has arisen the difficulty in the hands of philosophers of satisfactorily ascertaining a common cause of the beauty of objects whose qualities or attributes varied.

The different faculties of the mind have been each in their turn supposed to be the source from which the feelings, suggested by any object of taste, originated; consequently there are several metaphysical classifications of the æsthetic emotions, but, as the origin of the latter has been overlooked, they are open to more or less objection. I think the following division will correspond with the several forms of pleasure, though it is given merely to illustrate its different phases, and not intended to imply that any lines of demarkation actually exist between them :

- I. Physical ;
- II. Psycho-physical ;
- III. Psychical or Mental.

There are two distinct methods by which we can arrive at the psychological nature of pleasure: One is by assuming that a certain definite relation exists between the laws of our mental organizations and the agencies which have brought the external world to its present condition, and observing under what circumstances their joint effect is a feeling of pleasure; **this effect we will observe further to follow whenever the two systems of laws do not in any manner conflict in their action.**

But the other and much more satisfactory method is to **examine the question of life, and see if pleasure is necessarily involved with it; if, in short, pleasure forms its chief and proper results.**

Herbert Spencer says that "life is the continuous adjustment of internal relations to external relations." Now, this implies that there will exist in a conscious creature a feeling by which it can be guided in adapting its conditions to those of its environment, and as this adjustment becomes more and more exact, so will the feeling become correspondingly intense, and any want of correspondence in this compound relation will be attended either with a complete absence of this feeling or its direct opposite, viz., pain; while in creatures of low organization this process of adjustment on their part is purely passive, in others possessed of sensibility feeling is the active cause in inducing changes of structure to more complex states; only of the latter cases, therefore, is it true that "function is the determining cause of structure."

It follows, then, that the *sensorium commune*, the seat of the consciousness of sensation, will respond with a pleasant feeling to the stimulus of any sensation that is in harmony with its constitution or by whose aid its structure was originally produced. Its function is thus seen to be a purely arbitrary one, and as the first manifestation of life in animals furnished with a *sensorium* is feeling, we can conceive of no other response to the operation of those natural forces whose effect it is. The same reaction would necessarily follow in a *sensorium* produced by other laws or forces, and the harmonious

relation which now exists between them would then be *no* more violated than it is at present. On the other hand, its disposition to escape from an unpleasant sensation, or one which will impair its efficiency by being in conflict with the undisturbed natural laws which brought it into existence, is necessarily as great as its disposition to derive pleasure from one which it is adapted to receive; this idea is embodied in the well-known phrase "self-preservation is the first law of Nature." But the action of this last class of sensations does not stop at this point, as they not only affect the nerve-cell in a manner that results in a pleasant feeling, but they also produce a permanent modification in the life of the latter; they are, in fact, actually assimilated by the cell, and, as subsequent sensations must be more intense to produce the same effect, a higher condition of existence of the nerve-vesicle is finally reached.

This effect of "increasing complexity" is plainly perceptible in the development of the senses—those from which we derive the greatest physical pleasure being the farthest removed from the emotional and intellectual life, and *vice versa*. So near are visual sensations related to the emotions that it is often impossible to tell whether a feeling, produced through the agency of the sense of sight, is a sensation or an emotion; the state of mind commonly called fancy, in which the sensations of sight are brought into many relations with one another is often called an emotion, notwithstanding the purely physical origin of its components.

The action of artificial articles of diet which mankind use as luxuries proves in an indirect manner that which I have been hitherto trying to establish; at first the use of such substances as alcohol, tobacco, opium, etc., is attended with unpleasant sensations—and for the same cause that governs in the case of all unpleasant substances—but by constant use they overpower the resisting agency and produce a modification in the nerve-cells in the same manner by which their function was first generated, and then they become pleasant.

When two or more sensations or emotions, pleasant in themselves, follow one another very closely, it is sometimes observed that they present a definite character and appear simply as one; from this fact we derive the only general law of

al application which can be enunciated in regard to the es of the senses, viz., the desire for uniformity with va- and for the following reason: As the function of the um, although apparently simple, is the result of the ac- several natural forces all bearing a relation to one an- t follows that there will be a corresponding relation in ge of pleasant sensations, that is, there will exist a gen- nciple of uniformity between them, and to satisfy each t, so to speak, entering into the construction of the um, there will be needed a variety in the sensations in o derive the greatest possible pleasure from its use; is that a sensation pleasant in itself, if maintained for g a time, will finally culminate in disgust, and because ividual element, as it were, of the function of the sen- is excessively stimulated in comparison with the rest. y discussions have taken place as to whether there ay laws regulating complex harmonies, that is, if an ious train of pleasant sensations of one sense could be ven with a corresponding train of another sense, but e the law which I have just mentioned is the only one exerts any influence in the premises, and if its provi- e strictly adhered to I think such combinations can be

Pleasure.—This division of our subject need not detain long, as the extent of range of pleasant sensations is and well defined. There is a uniform pleasure in the tion of the instincts, and especially during infancy is dition of pleasure arising from simple sensations ob- and, as they are less liable to variation in different on account of accidental circumstances than the more ated emotions, all who possess the sensual organs in a condition will experience pleasure from similar sen-

re is one other sensation of physical pleasure, more gen- its character than any I have yet mentioned, known as *æsthesia*, which denotes “a favorably proceeding organic (Maudsley), and proceeds from the mutual action of a brain and mind, and is an indication of their normal to one another; it consequently does not vary at all ent individuals.

There is and can be no question about the effect produced by sensations as they are elementary feelings and are caused solely by the influence of physical agents upon nerves which terminate in the *sensorium commune*.

II. *Beauty*.—The former division stands on well-recognized and undoubted data—discussion relative to the scope and aim of the elementary sensations is not possible—but now the difficulty is much greater, as the most complicated emotions of which the human mind is susceptible have not only to be resolved into their elements, but also the origin of the latter has to be accounted for; the discussions incident to this subject have been chiefly relative to the causes and sources of beauty as exhibited by the various fine arts, or arts of imitation, so called because they derive their beauty purely from natural scenes; they include music, painting, statuary, poetry, architecture, and the drama.

The same difficulty that has always been encountered in metaphysical descriptions of states of mind appears also in this; philosophers, in dealing with this subject, have had either to draw their conclusions from an ideal standard which was unconsciously formed in their minds, or to simply relate the feelings of the complex emotion of beauty in the order in which they occurred. Either of these methods is wholly unsatisfactory, as there still remains at issue the important question as to the *origin* of the simple emotions or affections of our nature; the whole controversy hinges on this point, for, if it can be proved that pleasant sensations have had a share in the production of the simple emotions, all will admit that there can be no further room for doubting that they help to form the state of mind known as the emotion of beauty.

A theory of the emotion of beauty, therefore, must not only be in accordance with the general laws which make sensual gratifications pleasant, but it must also explain the bond of connection between different pleasures as exhibited in the successive developments of the susceptibility of the mind to pleasure.

In the development of the human mind the life of sensation preceded that of emotion and intellection; by the constant and invariable action of the law which I have said produ

"continually increasing complexity" of the sense organs, we finally arrive at a condition of mind in which there is a consciousness of the means by which our instinctive desires may be still further gratified; it is at this point that the first trace of the emotions and the *ego* is perceptible. After these feelings become "definitely organized" (Maudsley), they are called ideas, and, on the other hand, if ideas are sufficiently modulated they become emotions; sensory impressions, therefore, enter largely into the formation of ideas, and are the immediate forerunner of the latter. The history of language affords a good proof of the order of development of the mental faculties as I have here sketched it; expressions were first used to communicate sensations, and, as emotions were developed, they were called by the names of the physical attributes of objects which the mind instinctively supposed them to resemble. The history of the word "beauty" itself is not uninteresting in this connection, as Stewart says it was first used to denote the pleasing effects of colors and other sensations, then simple emotions, and finally every thing to which it is now applied. Those who are familiar with the essays of Alison, Knight, Frey, and others, on the subject of taste, will readily perceive that I have been trying to prove the necessity of an additional element in the association theory, viz., the "alloy of the senses in the constitution of beauty," and which Lord Jeffrey rejected because, he said, it was "at variance with the first principles of catholic philosophy." I would consequently use the epithet beautiful in connection with objects which have a *direct* power in suggesting or exciting pleasant emotions, that is, one whose physical qualities have become linked with pleasant emotions in virtue of the natural connection existing between pleasant sensations and emotions. Thus it is said that, when an object of taste is presented to any of our senses, an analogous state of mind is induced, that is, one in which there is a perceptible relation to the object itself; the mind instinctively establishes an identity between the emotions and the object, and clothes the latter, as it were, with the emotions which have been suggested, and refers the whole effect to it; the emotions are suggested simultaneously with the presentation of the object to the senses, and, as the sensation remains distinct

throughout, the natural bond of connection that exists between them is strengthened and the result is an apparently unmingled and uniform emotion. Sensations pleasant in themselves are almost invariably followed by corresponding emotions; in fact, it is only necessary for our ordinary ideas to be stimulated into a state of active feeling by a sensation, in order to experience fully the emotion of beauty. Even if emotions arose spontaneously in the mind, and without any aid from sensory impressions, they would be considerably enhanced by connecting them with pleasant sensations.

There only remains now the necessity to contrast this with the one other theory of beauty, that has been generally accepted by philosophers, and, as Lord Jeffrey was the most able exponent of the latter, the so-called association theory, I cannot do better than exhibit the following extracts from his article in the *Encyclopædia Britannica*:

"In our opinion, then, our sense of beauty depends entirely on our previous experience of simpler pleasures or emotions, and consists in the *suggestion* of agreeable or interesting sensations, with which we had formerly been made familiar by the direct and intelligible agency of our common sensibilities; and that vast variety of objects, to which we give the common name of beautiful, become entitled to that appellation, merely because they all possess the power of recalling or reflecting those sensations of which they have been the accompaniments, or with which they have been associated in our imagination, by any other more casual bond of connection. According to this view of the matter, therefore, beauty is not an inherent property or quality of objects at all, but the result of the accidental relations in which they may stand to our experience of pleasures or emotions; and does not depend upon any particular configuration of parts, proportions, or colors, in external things, nor upon the unity, coherence, or simplicity of intellectual creations—but merely upon the associations which, in the case of every individual, may enable these inherent, and otherwise indifferent qualities, to suggest or recall to the mind emotions of a pleasurable or interesting description. It follows, therefore, that no object is beautiful in itself, or could appear so antecedent to our experience

pleasures or emotions; and that, as an infinite variety of objects may thus reflect interesting ideas, so all of them require the title of beautiful, although utterly diverse and separate in their nature, and possessing nothing in common but this accidental power of reminding us of other emotions. . . . We conceive the object to be associated either with a past experience, or by some universal analogy, with other pleasures or emotions, that upon the whole are pleasant; and these associated pleasures are instantaneously suggested as the object is presented, and by the first glimpse of its physical properties, with which, indeed, they are consubstantiated and confounded in our sensations. . . . The basis of beauty, that the beauty which we impute to outward objects is nothing more than the reflection of our own inward emotion, and is made up entirely of certain little portions of love, or other affections, which have been connected with certain objects, and still adhere as it were to them, and move us whenever they are presented to our observation."

In order to make his opinions clearer, he asks two important questions: "First, what are the primary affections by suggestion of which we think the sense of beauty is produced? And secondly, what is the nature of the connection between which we suppose that the objects we call beautiful are fitted to suggest these affections?"

His answer to the first question is: "All sensations that are absolutely indifferent, and are at the same time either agreeable when experienced by ourselves, or attractive when communicated to others, may form the foundation of the emotion of sublimity or beauty. . . . The sum of the whole is a very feeling which it is agreeable to experience, to recall, to witness, may become the source of beauty in external objects, when it is so connected with them as that their appearance reminds us of that feeling."

His answer to his second question is: "Almost every thing which two objects can be bound together in the imagination in such a manner as that the presentment of the one shall call up the memory of the other. . . . It appears to us, then, that objects are sublime or beautiful—1. When they are the signs and perpetual concomitants of pleasurable sen-

sations, or, at any rate, of some lively feeling or emotion, in ourselves, or in some other sentient beings. 2. When *the* are the arbitrary or accidental concomitants of such feelings. 3. When they bear some analogy or fanciful resemblance to things with which these emotions are necessarily connected. . . The accidental or arbitrary relations are dependent upon the opportunities which each individual has had to associate ideas of emotion with the object to which it is ascribed."

It will be observed that he evades what I have before said was the most important question in the whole controversy, viz., the *origin* of the simpler feelings or emotions, and the constitution of their pleasure; I have shown that the emotions were developed from pleasant sensations, and that the tissue, whose function they are, is intimate in nature to that by which sensations are received: they consequently owe the pleasing effect of any stimulus to the same law that governs in the case of sensations.

But, aside from this, the association theory, as he has represented it, is defective in several other important points; he not only admits that the emotions thus suggested bear an analogy to the material object or its qualities, but he says, in the answer to his second question, that such objects are beautiful because they are the perpetual concomitants of pleasurable emotions. Now, if certain qualities of material objects are the perpetual and invariable accompaniments of pleasant emotions, it follows that there must be some principle or law connecting them, that one must be the effect of the other, and, as we can trace the action of the physical qualities with certainty in the pleasing sensations which result, it would be absurd, with our present knowledge of mind, to suppose that the original cause of their beauty was derived from the emotions. He evidently anticipated the dangerous consequences to his theory that were involved in the fact that some objects are the constant concomitants of pleasant emotions, for he gives such irrelevant illustrations of its occurrence as "the sight or the sound of laughter with the feeling of gayety; of weeping with distress; of the sound of thunder with ideas of danger;" it is almost unnecessary to add that the *sound* of laughter, or thunder, or the sight of weeping, are not called beautiful, nor,

deed, do the feelings with which they are connected form the emotion of beauty, except under special circumstances.

In fact, this theory, in its naked aspect, would regard all objects as perfectly indifferent to us originally, and the beauty which they might subsequently acquire, the result of casual or accidental associations alone. If this were true, we could not perceive their beauty instantaneously, either because it could simply be the result of the slow growth of pleasant and interesting memories in connection with them (the objects), or we would have to wait till the desired emotions presented themselves to the mind, and then connect and refer them to any object which was for the time being exciting sensations. The unsatisfactoriness of this explanation of the emotion of beauty will be apparent to every one, but it is the only one possible if we suppose that beautiful objects are only indirectly connected with the corresponding emotions. Again, the original cause would necessarily be lost sight of, as the emotions, having no relation whatever to the object, would not be influenced subsequently by it, and there is no reason to suppose that the uniform and definite character of the emotion would be maintained throughout, as is manifestly the case when any object of taste is presented to one of our senses. Of course, also, there would be no possible use in seeking for beauty, much less to create it by extending the domain of the fine arts (if the bond of connection between objects and emotions were simply accidental), as the result of our investigations might be either indifference or disgust—the effect depending altogether on the emotions at the time occupying the field of consciousness; it will be at once evident, another consequence of this theory, that there can be no principles by which criticism can be guided in judging objects of taste, nor any explanation of the existence of emotions which must have arisen spontaneously in the mind.

He says further that objects are styled beautiful “when they bear some analogy or fanciful resemblance to things with which emotions are necessarily connected;” this is undoubtedly true, but we know of no reason why it should be so if the source of the beauty was in the emotions; but, by supposing that material properties the original cause, it will be at once

evident why allied objects, that excite similarly pleasant sensations, will be beautiful.

As he has advanced several ingenious arguments to prove that sensations take no share in the production and maintenance of emotions, I will say a few words about those which particularly seem to militate against what I conceive to be the physical theory.

The first is the following: "Take, for instance, the case of a common English landscape—green meadows with grazing and ruminating cattle; canals or navigable rivers; well-fenced, well-cultivated fields; neat, clean, scattered cottages; humble, antique churches, with church-yard elms, and crossing hedges—rows, all seen under bright skies and in good weather—there is much beauty, as every one will acknowledge, in such a scene as this. But in what does the beauty consist? Not, certainly, in the mere mixture of colors and forms, but in the picture of human happiness that is presented to our imaginations and affections—in the visible and unequivocal signs of comfort, and cheerful and peaceful enjoyment—and of that secure and successful industry that insures its continuance—and of the piety by which it is exalted—and of the simplicity by which it is contrasted with the guilt and the fever of a city life—and in the images of health and plenty which it exhibits to every eye."

Now, I will reply by citing another similar instance, but in which there are no artificial incentives to emotion as exist in the one which he has given: Any natural scene which we may choose exhibits in its simplest foot as much of the power of the Creator as the highest Alps, is as capable of sustaining as many happy homes, of producing as many useful and luxurious products, and of suggesting as many moral qualities as the one he has mentioned; yet many such is passed over without exciting one emotion sufficiently intense to be called beautiful, while another will exhibit all of the characteristics of beauty. In what does this difference consist? The latter will be noted for the variety with the underlying principle of uniformity in the surface of the ground; the bright and soothing colors which are presented to our sight from every side; the fragrance of the flowers; the agreeable temperature of the air;

waving lines of the streams ; the lustre of the watery surface ; the hum of the insects, that also enjoy the conditions in which they are placed—all go to form the pleasant sensations that are immediately followed by the corresponding emotions.

His other example is a little more complicated : “ The most beautiful object in Nature, perhaps, is the countenance of young and beautiful woman. What we admire is not a combination of forms and colors, but a collection of signs and signs of certain mental feelings and affections, which are universally recognized as the proper objects of love and sympathy ; the signs of two different sets of qualities, that are either of them the object of sight, but of a far higher faculty ; the first place, of youth and health ; and in the second place, of innocence, gayety, sensibility, intelligence, delicacy, vivacity.” He then goes on to state that it would be impossible, by any other than the association theory, to account for the varying standard of female beauty in different countries, and insinuates that forms, colors, or other physical properties, in this instance at least, cannot enter at all into our judgment. This much, at any rate, is certain in female beauty, that we must suppose the *countenance* to fully express mental qualities with which we sympathize ; but it is impossible to estimate the share which the sexual instinct takes in forming what is called love, from the emotion itself ; the instinct and acquired feelings react mutually in such a manner that that female will be the most beautiful in the eyes of any individual of the species in whose society he supposes he can derive the greatest pleasure from the gratification of the intimately associated instinct and feelings. To those who will possibly answer that “ love remains after the instinct has died away,” I will reply, in the words of Griesinger, “ The æsthetic pleasure in society of an individual of the opposite sex, or the sensible conviction of their excellency, is first awakened through the mingling of sexual feelings and emotions with the states of mind which are in the whole termed love, and which with the extinction of the sexual feelings also ceases.”

One seeming objection to the view that I have advocated seems to be furnished by poetry, as pleasant emotions are excited by it without the intervention of sensation ; but it will

he observed that, in the great majority of instances, poetry calls to the imagination previously-experienced sensations of a pleasant character that are naturally connected with the emotions that follow. I will conclude this argument with a few data furnished exclusively by the anatomy and physiology of the nervous system :

1. Pleasant hallucinations or morbidly-pleasant sensations frequently give rise to pleasant emotions ; 2. Instincts, or laws by which we are impelled to seek actively the pleasure of sensations, when not gratified, will produce emotions of a vague but pleasurable character (Maudsley) ; 3. The imagination, which is popularly supposed to be the seat of the emotions, is the function of the tissue which connects the sensory nervous centres with the centres of intellection ; 4. Emotions which arise in the mind when the *cænæsthesia* is well marked, are apt to be pleasant (Maudsley) ; this last fact leads me to make one more remark about the so-called accidental beauty of objects. If objects arbitrarily will excite the emotion and still be called beautiful, then I would allow that there was no inherent power in material objects, or their qualities, capable of exciting the emotion of beauty ; but it is well known that we do not apply the epithet " beautiful " to such objects ; nevertheless, it is undeniable that the emotion of beauty is sometimes only casually connected with an object, and its philosophy lies in the following explanation : Pleasurable emotions frequently arise in the mind in a vague and indefinite manner, and with out any apparent cause, except the *cænæsthesia*, and we, seeking for an ordinary and habitual cause, refer them instinctively to any object that is then occupying the attention. 5. In melancholia, we observe that when patients have lost all aptitude for physical pleasure, their minds are filled with the most gloomy emotions, and, in a later stage, when their whole mental and physical life becomes painful, they seek to terminate by suicide an existence that has its principal law in abeyance.

Alison, the author of another excellent work on taste, has adopted a modification of the association theory, but still accepts its principal provisions ; he goes a little more directly into the subject, and explains the manner by which an object

ces the emotion of beauty. He says : " When an object is presented to the mind, a train of thought is awakened, imagination analogous to the character or expression of original object; that this train is composed of ideas of emotion, that is, of ideas capable of exciting some affection, that the character of the emotion must be the same throughout; and, further, that the beauty of material objects lies on the associations that may have connected them with the ordinary affections of our nature." It will not be necessary to deal again with the latter portion of his view, we have before shown what constitutes the bond of connection between objects and emotions; but when he says that the equal feelings of the train must be always similar I think so, and for the following reason: It is well known that we derive pleasure from representations of terror and distress in the fine arts, and that we sometimes willingly recall in our mind an unpleasant emotion—the cause, therefore, lies in the fact that at such conditions may be united with pleasurable emotion and in the former there is also implied in the object a power to overcome that which gives rise in us to the unpleasant feeling. He must also have supposed that there was a nervous centre in the brain for emotions, or he would have used the expression "ideas of emotion," but this has very generally been rejected of late years by physiologists.

word about sublimity: This complex emotion has been generally considered allied to that of beauty, and the same power have been assigned for both, but I think that the former can be proved to be totally different from the latter in so far as its origin and nature are concerned. Sublimity appears to be composed of mingled feelings of surprise and wonder or admiration, and to have for its cause any exhibition in which great power or energy is manifested. I say unusual, because any power with which we are familiarly acquainted possibly by its effects produce the emotion of beauty, but not cause sublimity; for the production of the latter, the effect of any cause, must be greater than any we would from previous experience consider possible: hence it is that things, which, when we first witness them, are sublime,

will subsequently lose that character when seen often—a familiar instance of this is afforded by a storm at sea.

III. The third division of the subject of pleasure includes all those states of mind in which there is a calm delight in observing not only those ideas that are necessarily a part of our mental constitution, but also all others that we may acquire during any period of our lives; its highest form is exhibited by the ideas that are involved in the investigation of the laws of nature. The presence of consciousness of any idea may be at times a source of pleasure, but only those will be invariably pleasant that have for a basis the laws that govern purely physical pleasures.

It would be more satisfactory to have given examples of the various forms of pleasure as detailed in the foregoing pages, as, I think, any possible normal pleasure can be reconciled to one or other of the divisions, but to set aright the principles is the most important step toward the elucidation of the subject.

ART. VI.—*Clinical Lectures delivered at the Bellevue Hospital Medical College, Session of 1870-'71.* By WILLIAM A. HAMMOND, M. D., Professor of Diseases of the Mind and Nervous System, and of Clinical Medicine, in the Bellevue Hospital Medical College; Physician-in-Chief to the New York State Hospital for Diseases of the Nervous System, etc.¹ The Histories prepared by T. M. B. Cross, M. D., Assistant to the Chair of Diseases of the Mind and Nervous System; and one of the Attending Physicians of the New York State Hospital for Diseases of the Nervous System.

LECTURE VII.

GLOSSO-LABIO-LARYNGEAL PARALYSIS.

THE case before us is an example of a very interesting and very important disease, which, though it has undergone

¹ Phonographic Report of Dr. John Winslow.

existed for a long time, has never been recognized as distinct affection until within the last ten or twelve years. Thirty years ago, Prof. Trousseau was requested to examine a distinguished personage of France, and made a memorandum of the phenomena observed, the chief of which inability to speak, restraint in moving the lips, and extreme difficulty in swallowing. About twenty years later, Duchenne, knowing nothing of this memorandum, described definitely the affection which I now bring before you, calling it progressive paralysis of the tongue, lips, and veil of palate. Trousseau subsequently brought forward other cases, and delivered a very interesting lecture upon the disease, in which he named *glosso-laryngeal paralysis*. He gave Duchenne full credit for its discovery, while claiming for himself prior observation of the single case above referred to, of which, however, his memoranda had been put aside and forgotten. To Duchenne, therefore, belongs the credit of the discovery of the malady, as also of its latest working-up; for he has recently gone over the ground again, changing the name to *glosso-labio-laryngeal paralysis*.

This is quite a rare affection. I have seen altogether, in my city, seven cases of it, before the present one, and this is more pronounced than any of them. Undoubtedly we have the malady in its incipency, or at least in a very early stage, so that its physiognomy and symptoms are not well defined. Commonly these are so characteristic that you have no difficulty in pronouncing the diagnosis at once. I remember that in the last case I saw — that of a banker from Kansas, who had come on to consult Dr. Sayre and myself, but by the doctor's absence had seen me alone—I was able to tell what was the matter the moment he entered my office, to describe his symptoms accurately without his help. The patient was unable to speak; but, as in this case there was no impairment of the intellect. In all of my other cases, the patients could not speak a word at the time I first saw them; and the paralysis of the lower face had already proceeded so far, that it remained as motionless as a mask, while the eyes and the muscles around and above them were full of intelligent expression.

But before describing in detail the symptoms of this disease, or considering its pathology, let me read you the elaborate history of the present case, which has been prepared by Dr. Cross :

CASE I. *Glosso-Labio-Laryngeal Paralysis*.—"W. H. S., aged thirty-two, born in New York, married, the father of two children, both of whom are living; a book-keeper by occupation. He has always been very temperate in his habits. There is no hereditary predisposition in his family to diseases of the nervous system. He has never had acute articular rheumatism, syphilis, nor in fact any disease of importance, until the beginning of the present trouble, which he dates back to the winter of 1867. Up to that time he had always been a tolerably healthy man, and even now he attends to his daily avocations, and does not consider his affection of much moment. His father died of cholera some years ago; his mother and her children are all living at the present time. His grandparents on both his mother's and father's side were very long-lived people, reaching the average age of eighty.

"The first thing that attracted the attention of the patient, in the winter of 1867, was a peculiar sensation at the angle of the mouth, and the inner canthus of the eye on the left side. He says he felt like rubbing those parts continually. This sensation very slowly and gradually extended, and it was not until the winter of 1869, two years subsequently, that he became aware that not only his left cheek, but also his left temple, was very numb. At this period, while meditating over his accounts, he often struck his left cheek with the end of his pencil as one is very apt to do, when he was conscious of a very peculiar feeling which would start from the point struck, and travel rapidly upward, terminating at the left temple. This numbness or anæsthesia remained limited to these parts on the left side for a period of several months, before any other perceptible change took place. There was also a loss of sensibility in the mucous membrane lining the left cheek and the gums on that side, which he had noticed from the very first; he likewise chewed his food mostly on the right side, but attributed this more to the loss of feeling than to any want of

Since 1867 he was aware that there was something with his face, but he had no idea that there was any *anæsthesia*, and supposed the trouble to arise from the non-cutting of a wisdom-tooth on that side. At the time that the numbness had extended to the left temple, he experienced a sense of constriction around the border of that eye, as though a rubber band were encircling it. During the month of January, 1870, the *anæsthesia*, which was prior to this period, extended entirely to the left side, began to extend, and progressed across the forehead, from the left temple to the outer surface which circumscribes the right orbit, and to a spot situated on the malar bone. Now he had ringing in the left ear, which was subsequently followed by impairment of hearing, to such a degree that he was unable to hear the ticking of a watch, or to understand persons conversing at a low tone of voice.

During the winter of 1868 he had twitching of the left eye, which, after lasting for about a month, disappeared. In the month of September, 1870, the numbness again began to increase, and now attacked the parts about the naso-labial fissure on both sides, where it even now persists. It was at this period that his eyes became very much congested; and in addition, although varying in degree from time to time, remained so for at least a month. The left, however, was much more congested than the right. Soon he experienced some difficulty in reading, and at times he could hardly read at all. When the numbness had involved both naso-labial fissures, he noticed a stiffness about his mouth which resembled that which would result from a want of natural mobility which is caused by exposure to severe cold. For the first time he had slight difficulty in swallowing; yet this was not caused by any interference with the act of mastication, for his food was well prepared, but the first act of deglutition was not easily performed. For the past year he has been subject at times to vertigo, whenever he suddenly changed his position. When leaning forward, if he suddenly raised up his head, he became giddy and had temporary loss of consciousness, only for a few seconds, however; and occurred often many times in a day. Even on changing position in bed he became dizzy. About a year ago he

became aware that he could not walk very well in the dark, and especially with his eyes closed, yet he did not experience any diminution of motor power in his lower extremities. During the last three months he has had more or less trouble in making water, which did not come as freely as it used to do, and consequently he has been obliged to strain in order to empty his bladder. There is no stricture or other cause of obstruction in the urethra. Within the last two months he has had pain in the occiput and in the vertex, which would come on two or three times a day and last for about half an hour at a time. This pain was not very severe in character. Two months ago he noticed, while leaning forward in the act of writing, that the saliva fell from his mouth drop by drop. He has very gradually lost his virile power, and he noticed this failure from the onset of the disease. Only within the last month has he become conscious of a slight embarrassment in his speech.

“Such is the history of this patient up to the 9th of January, 1871, when he came under the observation of Dr. Hammond. The following points of interest were ascertained January 12, 1871. Present condition: There is double facial paralysis, which is more marked on the left than on the right side of the face. The lower part of the face is immovable, while the upper is immediately thrown into action whenever the patient laughs or talks. There is at times twitching of the upper lip, and involuntary lifting of both upper eyelids, with a peculiar stare of the eyes, as though they were looking at vacancy. There is at present a feeling of constriction around both eyes. There are oscillatory movements of the eyeballs (nystagmus), which are in a lateral direction, and are almost constant. On this account, ophthalmoscopic exploration was not made. He has double vision at times. When he writes he is very apt to omit or misplace letters in many words, and in conversation he often miscalls or misplaces words. His memory of words is not perfect. He has pain still in the back and top of his head. There is no pharyngeal constriction. The first act of deglutition is imperfectly performed, yet it is not in the least painful; and the patient described it exactly when he said, ‘When I want to swallow, it will not work.’ The food col-

lects between the cheek and the gums on the left side, but he can remove it with perfect ease by his tongue. He chews his food mostly on the right side, yet he can chew it very well on the left. At present he has very little vertigo. There is no nasal resonance in his pronunciation, and his friends do not notice any change in his voice. His pupils are exactly equal. It is difficult for him to look to the left, but he can turn his eyes to the right and see objects without any trouble whatever. On account of this he always takes a seat on the right side of a car in travelling. There is no strabismus, no ptosis, and at present only very slight conjunctivitis of the left eye. His nose is drawn to the right side, and the right nostril dilates and obeys the actions of its numerous muscles much more readily than the left. His mouth is dry, and the secretion of saliva is much diminished. In swallowing liquids he experiences no difficulty, but it is a great effort for him to swallow solids unless he takes a quantity of fluid at the same time. In speaking he clips his words; and although he can pronounce every letter in the alphabet, yet he does not evince in his enunciation of the letters that clearness and distinctness of sound which he would undoubtedly have if he had full command over all the muscles concerned in articulation. There is much stiffness about the orbicularis oris. Occasionally, when leaning forward, the saliva falls from his mouth *guttatim*. There is no throbbing, no twitching, no tremulousness, nor deviation of the tongue. His tongue is perfectly mobile, and he can move it freely in any direction. His mouth is drawn to the right side; yet he can open and shut it quite readily, draw it to one side or the other voluntarily, and compress the lips, but when he laughs or talks in an animated manner its defective action immediately strikes the eye. He tires after talking, from the fact that his mouth becomes very dry. There is no feebleness whatever of the voice. The soft palate is relaxed, more especially on the left side, and the natural arch is lost to a greater or less extent, while the uvula is drawn over to the right side.

“Tactile sensibility is diminished in the mucous membrane of the tongue, hard and soft palate, the gums, cheek and lips on the left side; in short, there is anæsthesia of the whole left side of the buccal cavity, which is limited exactly by the mesian line.

Tactile sensibility is also diminished in those parts of the face where he felt the numbness, namely, on the left temple, around the left eye, and here to the greatest degree, around the right eye, on the malar bone, and here limited to a circumscribed spot, and lastly in the region of both naso-labial fissures. The sensation of pain is as acutely felt in all these externally anæsthetic parts as in the healthy tissue, excepting in the circumscribed spot on the malar bone. There is impairment, not actual loss, of taste, on the left side of the tongue. On the left side of the buccal cavity, the tongue included, the sensibility to pain by electricity is diminished. All the muscles of the face respond to the Faradaic current. He can whistle and expectorate, but he does not purse up his lips very strongly. Irritation of the soft palate does not produce normal contractions, although it responds feebly to a stimulus. There is no atrophy of the tongue or of the lips. Tactile sensibility and the sensibility to pain are normal in all other parts of the body. With the exception of the regions already mentioned there is no numbness nor abnormal sensation to be discovered anywhere. There is no trembling of the limbs. There is some difficulty of locomotion in the dark, and on first arising in the morning. When his eyes are closed he oscillates from side to side, and if not supported would fall. He still has some trouble in passing his urine. In regard to spinal symptoms with the exception of the want of coördination and the bladder they are entirely negative. His intellect is perfectly clear, evinced by his great quickness of comprehension and intelligence. His heart and lungs are healthy. He is well. His appetite is good. His bowels are regular. His pulse is 68, slow and full. His respiration is full, deep and regular. There is no paralysis nor even paresis of the limbs so far as can be ascertained. He can close quite perfectly both eyes simultaneously, or he can close one at a time. He rises quickly and naturally, and the second act of deglutition is normally performed. The lips, on attentive observation, seem to have lost their ready play or tonicity, and the angle of the mouth on the right side is thrown into action to a greater extent than the opposite angle. That innervation which resides in the different facial muscles

ose normal tension and irritability depends the faculty of expression, is greatly impaired about the mouth and the whole lower part of the face on both sides. The muscles at the right angle of the mouth and on the right side of the face respond to a weaker Faradaic current than on the left. He can blow with sufficient force to put out a candle, but the current of air is imperfectly directed, owing to the lack of the harmonious action of the muscles of the mouth and lips. His general health is at the present time so good that he thinks, if it were not for the slight difficulty which he experiences in swallowing; and his impairment of coördination, he would be as well as he ever was in his life. The treatment in this case consists in the internal administration of strychnia as follows:

Strychniæ sulphatis gr. j, quinine sulphatis et ferri pyrophosphatis ʒʒ 3j, acidi phosphorici diluti ʒ ij, syrup. zingiberis ʒ ij. M. S. A teaspoonful in a wine-glass of water three times a day; together with the application of the primary galvanic current to the base of the brain three times a week, and the application of the induced, or Faradaic, current to all the muscles of the buccal cavity, the lips, and the muscles of expression which are involved in the disease. The patient has now been under treatment about a month, and during that period the disease has made very little, if any, progress in its upward course."

Such, gentlemen, is the history of this very interesting and instructive case. Let us note the order in which the symptoms have made their appearance, and we shall find it decidedly different from that usually observed in the disease.

The first thing which attracted the patient's notice was anesthesia of a portion of the left side of the face and buccal cavity, not loss of motility. That shows that there was primarily implication of the trifacial nerve on that side. Now, in every other case which has come under my observation or reading, the starting-point was in the hypoglossal, as indicated by loss of motility in the tongue. By reference to these diagrams upon the board, you see that the fifth nerve has its superficial origin at the anterior part of the side of the base of the Varolii; and the fibres of its sensory root, which at

present concern us, have been deeply traced to nuclei in the medulla oblongata, on the floor of the fourth ventricle. I have no doubt that, in this case, the disease originated in these nuclei.

The next nerve involved was the auditory—the eighth of Sömmering; he lost, to a great extent, the sense of hearing on the left side. The auditory nerve, which you see leaving the pons posterior to the fifth, has, like that, its deep origin in the floor of the fourth ventricle. I think we have clearly the right to conclude that the disease, which commenced in the nuclei of origin of the fifth nerve, gradually extended until it involved those of the eighth.

Still progressing, the disease next invaded the origin of the facial (seventh of Sömmering), the great motor nerve of the muscles of expression. For we find the patient complaining of a feeling of stiffness about the lips, a little want of play in the orbicularis oris—a muscle supplied, as you know, by the facial. This nerve leaves the pons close to the auditory (so that the two were formerly classed together as the seventh nerve), its fibres being traced to the outer wall of the fourth ventricle, and to the restiform and olivary tracts of the medulla. The partial paralysis, first perceived in the lips, extended later to some of the neighboring muscles; the buccinator, for example, began to refuse duty, and allowed the food to get between the gums and the cheek. You see that the gentleman holds his lips slightly open, and when he is leaning forward, intent on his work, the saliva sometimes drops from them. But he tells me that it does not flow from his mouth at night, which is rather surprising; for many persons with no facial paralysis find their pillow wet in the morning. It is especially apt to occur from the general relaxation of the muscles in old age.

About this time, or somewhat earlier, there was some twitching of the left eyelid, and afterward a feeling of constriction about it. Now, twitching of the lid I used to suppose was always caused by spasm of the levator palpebræ superioris, supplied by the third nerve. But having it badly myself at one time (I do now when I smoke too much), I watched the movements carefully before the glass, and was not a lit

to find they were not such as would proceed from an action of the third nerve—for this nerve comes from the cerebellum, an ugly spot to have trouble with. I saw that the movement was not directly upward and downward—the movement possible from the action of the levator—but was a twitching downward and inward, and evidently by spasm of some fibres of the orbicularis palpebrarum, drawing the upper lid toward their origin at the tendo oculi. This muscle is supplied by the facial; and it need not surprise us, as in the present case, irritation of some of the fibres of the facial nerve at their origin preceding or accompanying the paralysis of other fibres (e. g., those distributed to the orbicularis oris). You will recollect, too, that Dr. Cross speaks of involuntary raising of the lids. This likewise does not in the present case from any spasm of the levator palpebrarum superioris, but from slight convulsive action of the obliquus superior, a muscle also supplied by the facial nerve.

As nystagmus and double vision, it is true, might lead us to suspect some difficulty with the third pair, resulting from weakness of the internal rectus and that intermittent, tremulousness which weakened muscles are apt to display. But in connection with the early twitching of the lid, a clinical observer would perhaps diagnose at once a paralysis of the motor oculi communis. But if that were the case, we should expect also ptosis by this time, and contraction of the pupil, neither of which is present. There may very likely, also, be some interference with the functions of the superior and the inferior rectus, while in fact the patient holds his eyes pretty still when he looks straight forward. It is, then, must we ascribe this lateral oscillation of the eyes, which is so strongly marked when he tries to look to the right? It can be due only to spasm or paralysis—probably paralysis—of one or both of the external recti; and, as he can turn his eyes easily to the right and with difficulty to the left, doubtless the left external rectus which is weakened. These muscles are supplied by the sixth pair of nerves, which taking origin, close to the pons, from the anterior pyramid of the medulla oblongata, and which may be traced to the floor of the fourth ventricle.

There is in this case no paralysis whatever of the tongue that is, the hypoglossal is not yet involved, that nerve arising lower down than those we have seen affected. Whence, then the difficulty of swallowing? It must come simply from want of power over the palatal muscles (levator palati, azygos uvulae and tensor palati) supplied by the facial, through the sphenopalatine and otic ganglia. Indeed, these muscles are seen on inspection to be relaxed on the left side; and the dryness of the mouth indicates that the parotid gland, which also derives its supply from the otic ganglion, has lost something of its functional activity. There seems, then, to be no trouble in the medulla oblongata lower down than the deep origin of the facial. Neither the pneumogastric nor the spinal accessory has suffered, so that there is no interference with regular and complete respiration, or with phonation. The man's voice is as strong as ever, and he can blow his breath with much force while in no other case I have seen could the patient blow out a candle.

Some of the symptoms, as the attacks of vertigo and of pain, suggest cerebral difficulty; but the man's intelligence is unimpaired, as evinced by his quick and clear answers to my questions, and, if there be any organic disease of the brain, I am unable to make it out. I think we are justified in excluding structural lesion, and attributing these symptoms to some derangement of the cerebral circulation.

The patient, as you see, cannot, with his eyes shut, either stand still or walk steadily across the floor, but keeps swaying from side to side; and he says that he cannot walk in the dark. You have seen this symptom in two cases which came before you at a previous lecture, and we then found it dependent upon a loss of the sense of pressure and of sensibility in the soles of the feet.¹ This loss of sensibility is frequently due to an affection of the posterior columns of the cord, as in locomotor ataxia, but not invariably, for you get the same symptom when the feet are "asleep," for example, from cold, or from pressure on their nervous trunks. In the present instance there are probably independent centres of trouble in the sensory tract of the cord, as evidenced not only by the want of coördination in

¹ PSYCHOLOGICAL JOURNAL, January, 1871, p. 81.

walking without the aid of sight, but also by some awkwardness the patient finds in buttoning his collar, doubtless from diminished sensibility in the fingers. The difficulty in evacuating the bladder also points to some morbid condition of the cord.

Thus, we have gone over the main points in the history of the case before us, and, in order to show their connection, I have been obliged to anticipate to some extent its pathology. The patient may now be dismissed; while, to complete our picture of the disease, I must rapidly sketch those features which our model does not exhibit.

As I have said, the tongue is commonly first affected. The patient discovers that he cannot clearly articulate the lingual consonants. A little later he is unable to raise the tip of this organ to the roof of the mouth, or to employ it to keep the food between the teeth in mastication. Soon the first act of deglutition becomes difficult—the alimentary mass cannot be readily carried back and pressed against the constrictors of the pharynx; and finally the tongue lies utterly inert on the floor of the mouth. By this time the lips have begun to suffer; they tend to remain apart, and the saliva dribbles from them; the vowels *o* and *u* cannot be distinctly sounded; whistling and spitting become impossible. Then other muscles supplied by the facial partake in the paralysis—the buccinators, the elevators of the palate and of the uvula, and the tensors of the palate; and swallowing becomes harder than ever, the food being often forced from the pharynx back into the mouth, or ejected through the nose. By-and-by the pharyngeal constrictors themselves can no longer be trusted—the pneumogastric and spinal accessory are becoming involved. When these nerves are still further affected, we find the power of phonation lost, and that of respiration seriously impaired, from paralysis both of the glottic muscles and of those fixing and moving the ribs. Every attempt to swallow is now attended with imminent danger of suffocation, from portions of food or drink entering the larynx, and the impossibility of coughing vigorously to throw them out again. A fatal bronchitis or pneumonia may thus be set up; or, if the patient escape these, as well as all the chances of strangulation, he dies at last of inanition.

Thus, in what has heretofore been regarded as the typical form of the disease, we have simply progressive motor paralysis, in muscles innervated by the hypoglossal, the facial, the pneumogastric and the spinal accessory (partly through the pharyngeal plexus), and lastly by some of the spinal nerves—for the phrenic and even the intercostal nerves seem to be sometimes affected. Trousseau tells us that sensibility is wholly intact, and that even the reflex irritability of the paralyze muscles is retained.

Now, the case we have to-day been examining, and on other which has come under my observation, enable me to say that there is another type of the disease, in which the primary symptom is loss of sensibility, attended sometimes by hyperalgesia, the motor paralysis not appearing until later. I find also, on a careful review of Trousseau's cases, that one of those is to be placed in the same category.

There is no doubt that this disease was for some time confounded with progressive muscular atrophy, or Cruveilhier's atrophy, as it is often called—a malady characterized by progressive wasting of the affected muscles, and by their weakness in consequence of this wasting, not in consequence of deficient motor innervation. It so happens that in several reported cases the two affections were coincident; that is, there was motor paralysis of the parts we have been considering, with atrophy of some muscles of the trunk and limbs. These two conditions are sufficiently distinct. In the one we have primarily paralysis of motility, and only such subsequent atrophy of the muscle as results from its disuse. In the other we have primarily atrophy of the muscle, and only such loss of power as this necessarily entails. But Trousseau, on the basis of several post-mortem examinations, considered that their association in the cases referred to was something more than accidental. For the chief lesion found in these autopsies was atrophy of the roots of those motor cranial nerves we have enumerated, and of the motor roots of some of the spinal nerves. He suggested, therefore, that glosso-laryngeal paralysis and progressive muscular atrophy were only varieties of a palsy, dependent upon an affection of the cord or of the medulla oblongata, whose chief anatomical expression was this atrophy of motor roots.

It was reserved, however, for the searching eye and the fertile brain of Duchenne, only a few months ago, to proclaim at once the facts and the theory which should exhibit the relation between these affections, and mark a great advance in our nervous pathology. The paper was published in Brown-Séquard's *Archives* for August, 1870. You know that everywhere in the nervous system the gray or cellular matter is considered to be the source of nervous power, while the white matter is held to be only its conductor. Now, Duchenne's theory is, that there are at least three distinct kinds, or sets, of cells, the exclusive function of one set being to preside over sensation (sensory cells); that of another set to preside over motion (motor cells); that of a third set to preside over nutrition (trophic cells). Each set of cells has its own exclusive conducting fibres; but the motor and trophic sets are apt to lie near each other, and their conducting fibres to go together in the same bundle (or "nerve"), while those of the sensory set often take an independent course to their distribution. The anterior roots of the spinal nerves, for example, start probably from both motor and trophic cells, the posterior from sensory cells alone. There are no microscopic distinctions as yet made out between these functionally different sets of cells, though it is not impossible that such distinctions may in future be discovered. The theory of their functional difference is an inference which physiology draws from the data furnished by pathology.

What are these data? In a post-mortem examination of a patient who had suffered profound atrophy of the tongue and facial muscles, and had died from some other cause, Duchenne found that not only were the roots of the hypoglossal, facial, and some other motor nerves much shrunk at their emergence from the brain and cord, but the cells about the deep origin of these nerves had, to a great extent, disappeared, and been replaced by connective tissue. In some places he could even count the cells in connection with the nerve-root, and in one instance there were only nine or ten to be found. Of what kind were the missing cells? Though the microscope could give no answer, yet the fact that the effect of their disappearance was not paralysis, but atrophy of the organ supplied by

their nerves, clearly pointed to them as trophic cells alone. Similarly, had the medulla oblongata presented precisely the same appearances, and the history of the case shown not a diminution in the size of the muscle supplied, but simply a lack of nervous motive power, he would have been warranted in supposing that it was the motor cells which had suffered destruction. And so, if a certain number of cells and the sensibility of a peripheral area having nervous connection with them, had disappeared together, we should justly regard it as presumptive evidence of a genetic relation between them.

Now, if the lesion, resulting in destruction of nervous cells, be of centric origin—for example, if it be a sclerosis due to chronic hyperæmia or inflammation—it is extremely unlikely that it would affect only one of two or more sets of cells lying in close juxtaposition. We should expect, therefore, to find motor paralysis and muscular atrophy in frequent companionship; and this, as I have said, is really the case, the same muscles being both palsied and atrophied. We shall see, however, when I come to speak more particularly of wasting palsy, that it seems frequently to have a peripheric origin, in over-exertion of the affected muscles, and consequent exhaustion of their nervous centres; and in such cases we often find no primary motor paralysis. When, as in the case you have just seen, the trouble begins with paralysis of sensation, we should hardly look for attendant atrophy; and in point of fact, in this case, there is no atrophy whatever, as both Dr. Cross's examination and my own have distinctly proved. Still, we have much to learn concerning the etiology of nervous lesions before we can hope for a wholly satisfactory explanation of the apparent anomalies of association which sometimes occur.

You have already divined that not only the forms of paralysis which chiefly concern us to-day, but others as well, are explained by this theory of the disappearance of central nerve-cells having special functions. Thus, locomotor ataxia, which our patient exhibits in some degree, and the characteristic lesion of which is sclerosis of the posterior columns of the cord, falls into the same category. So, too, with "essential," or, as I have termed it, *organic* infantile paralysis, which depends upon destruction of both motor and trophic spinal cells.

With reference to the causes of glosso-labio-laryngeal paralysis very little is known. The course of several diseases, however, shows that there are two radically distinct forms of centric cell-destruction in general, the one acute, the other chronic. In the first, of which organic infantile paralysis may serve as the type, the invasion is sudden, and the affection may become fully developed in a few hours, after which it progresses very slowly, if at all. In the second, the invasion is very gradual, and the disease is essentially progressive, the cells probably undergoing a slow absorption. To this form belong glosso-laryngeal paralysis, progressive muscular atrophy, progressive locomotor ataxia, and so on. Now, upon the matter of etiology, it has been definitely ascertained that the chronic form may be inherited, but the acute shows no such tendency to hereditary transmission.

Age seems to exert a predisposing influence on the development of the disease in question. The present patient is the youngest, on record, to manifest it, being but thirty-two years of age; and I have seen it positively stated that the disease never appears under the age of forty-five. In this case, indeed, I am unable to discover any probable cause.

One of my patients, a very small man, fifty years old, dated the origin of his malady to some one's coming up behind him and lifting him by his head, "to show him London." I have seen a number of instances where incurable affections were brought on by this same silly trick.

The prognosis is wholly bad. Our patient, comfortable as he now appears, has scarcely a possible chance for recovery; for, of some forty cases of the disease fully reported, every one has gone on steadily, or with only slight remissions, to a fatal termination. Of the seven cases which have come under my own observation before the present, but one is alive—the Kansas City banker—and he only because he has not had time to die. I have sent him home, with the unfavorable prognosis which I always give.

There is no need, then, of my dwelling upon the question of treatment. I tell patients frankly there is no use in it; and for only one of my former cases have I attempted to do any thing with any hope of cure. That was my first one, a gen-

tleman sent me by Dr. Bradley, of this city. I applied galvanism to the muscles of the tongue and throat for three or four weeks, and it certainly did effect something. The man got so that he could swallow quite well, but the improvement was only temporary, and soon the current ceased to elicit any response. In a few other cases the dysphagia has been mitigated for a time by like means. I am treating Mr. S. here with the galvanic current passed through the brain, and the medulla oblongata, and the Faradaic current to the muscles of the face. He is also taking phosphorus and strychnia. These are the only means that promise to be of any service, and, a patient insists upon being treated, you may employ the to give him a transient respite or to alleviate his distress.

CONTEMPORARY LITERATURE.

THE writings of Mr. Darwin,¹ though by no means voluminous, have excited a wider interest, and provoked more discussion, than those of any other scientific author of the day. They have also rendered Mr. Darwin's name as widely known as that of science itself, and have gained him many friends and disciples, and not a few zealous opponents. The startling opinions and suggestions put forth in his "Origin of Species," in 1859, took a deep root in the public interest, and brought forth much fruit. It is remarkable, too, that many who at first read only to ridicule, at last became converts to the theories of Mr. Darwin, and warm advocates of the strange doctrines he taught. But even those who totally rejected his doctrines, could not fail to appreciate his wonderful industry, his sincerity, and his constant loyalty to science and truth. His theories were the result of conscientious and laborious investigations, and were never placed in offensive antagonism with the views of his opponents. And now, after more than ten years of study and preparation, he gives to the world his matured thoughts on the intricate problem of the origin of man. For many years the author has been collecting the material we here find so skilfully brought together. "The sole object of the work," we are told in the preface, "is to consider, firstly, whether man, like every other species, is de-

¹ The Descent of Man, and Selection in relation to Sex. By Charles Darwin, M. A., F. R. S., etc. With Illustrations. In two volumes. New York: D. Appleton & Co., 1871.

scended from some preëxisting form; secondly, the manner of his development; and, thirdly, the value of the differences between the so-called races of men." Originality is not claimed for many of the facts stated regarding man, but the author is original in his mode of dealing with them in their relation to other facts regarding the lower animals.

"The Descent of Man" consists of two parts. The first part is entitled the "Descent or Origin of Man," and constitutes about one-fourth of the entire work. The remaining three-fourths, constituting the second part, are devoted to the subject of Sexual Selection, which is treated of in the most elaborate detail.

The argument in regard to the descent of man opens by a comparison of the bodily structure of man with that of the animals below him, showing that man is constructed on the same general plan as other animals, and betrays in many particulars his descent from and close relationship to lower forms. The close similarity of tissue is shown by the liability of man to receive various diseases from the lower animals, and communicate the same to them. Monkeys are said to be subject to many of the diseases common to man, and to be affected in the same manner by medicines. Some tribes of monkeys have a decided appetite for stimulants and narcotics, and readily drink spirituous liquors. They have also been seen to smoke tobacco with evident gratification. These facts prove a similarity in the nervous organization. The similar mode of reproduction, common to all mammals, is also urged as an important feature in the general correspondence. The singular likeness of the human embryo in its successive stages to that of lower animals in more advanced stages is certainly a strong point in favor of Mr. Darwin's views. The existence of useless rudimentary organs is another point. Of this the author says: "Not one of the higher animals can be named which does not bear some part in a rudimentary condition, and man forms no exception to the rule." This interesting subject is more fully discussed by Mr. Darwin in his work on the "Variation of Animals and Plants under Domestication." The rudiment of the pointed ears of man's progenitors is found in "a little blunt point, projecting from the inwardly folded margin or helix." This is not uncommon in the human ear. The author thinks that the wisdom teeth in the more civilized races of men are undergoing a change and tending to become rudimentary. They appear late in life, and at irregular periods; they are much more liable to decay. In the Melanian races the wisdom teeth have three fangs, and seldom decay. The vermiform appendage of the cæcum is the only known rudiment in the alimentary canal. The hook-like process of bone generally

ound near the lower end of the humerus in man is regarded as the homologue and rudiment of the supra-condyloid foramen found in the carnivora. Judging from ancient skeletons this foramen was much more distinctly marked in man in times past than it is at present. The os coccyx is deemed the rudiment of the true tail in lower animals. All these rudiments were possessed, it is supposed, in a perfect state by our progenitors, and either through disuse or natural selection became gradually reduced. These facts, together with the phenomena of development, point to a community of descent, and make that theory so clear to the author, that he says of it: "It is only our natural prejudice and that arrogance which made our forefathers declare that they were descended from demi-gods, which lead us to demur to this conclusion."

In his comparison of the mental powers of man with those of the lower animals, the author admits the difference to be enormous, even between the lowest savage and the most highly-organized ape; yet he feels convinced that the difference is in degree and not in kind. Man possesses the same senses with the lower animals; he has some instincts in common with them, and they are excited by the same emotions as man. Many of the qualities we admire in man are found in others of the higher animals, as courage, good temper, fidelity, maternal affection, kindness. Some kinds of monkeys die of grief on the loss of their young, and in the care of their infants they manifest great tenderness, washing their faces, and driving off the flies that torment them. Even the more intellectual emotions are shared by the animals, as wonder, curiosity, imitation, attention, and memory. The fact that many animals have vivid dreams is considered a proof that they possess some power of imagination. Reason is commonly spoken of as the prerogative of man alone, but Mr. Darwin gives some interesting anecdotes of animals, showing beyond doubt the possession of a certain degree of reason. Therefore he differs from those authors who insist upon separating man through his mental faculties, by an impassable barrier from all lower animals. The argument that man alone is progressive does not appear to be sustained by facts; it is shown how great has been the improvement in our domestic animals by culture, and among the wild animals the older ones have superior mental faculties to the young; they learn by experience. Articulate language is peculiar to man, but many animals are able to express their feelings and thoughts by a special language; this has been greatly modified by domestication. The dog, for instance, has learned to bark in five or six distinct tones having its own signification. But man, in common with the

animals, uses inarticulate cries and gestures to express his meaning. "I cannot doubt," says the author, "that language owes its origin to the imitation and modification, aided by signs and gestures, of various natural sounds, the voices of other animals, and man's own instinctive cries." In this connection the strong tendency of monkeys, idiots, and the barbarous races, to imitation, is thought worthy of notice. It is considered probable that some rather early progenitor of man used his voice largely, as do some of the apes now, in producing musical sounds. As the voice was used more and more, the vocal organs would become strengthened and improved, until they were fitted for speech; and the various emotions would thus come to be expressed by a rude sort of language. Therefore it is argued that the faculty of articulate speech does not offer any insuperable objection to the theory of the development of man from a lower being.

The discussion of self-consciousness, individuality, abstraction, and general ideas, is necessarily brief, owing to the vague definitions attached by different writers to these terms. The author says: "Such faculties could not have been fully developed in man until the mental powers had advanced to a high standard, and this implies the use of a perfect language. No one supposes that one of the lower animals reflects whence he comes or whither he goes—what is death or what is life, and so forth. But can we feel sure that an old dog with an excellent memory, and some power of imagination, as shown by his dreams, never reflects on his past pleasures in the chase? And this would be a form of self-consciousness. On the other hand, as Büchner has remarked, how little can the hard-worked wife of a degraded Australian savage, who uses hardly any abstract words, and cannot count above four, exert her self-consciousness, or reflect on the nature of her own existence?" That animals retain their mental individuality is unquestionable, for their memories survive many complete changes in the atoms of the brain.

The sense of beauty is stated by some writers to be peculiar to man, but Dr. Darwin brings abundant proof that birds and other animals have a high sense of the beautiful in color, and that it has much to do with the courtship and love of many kinds of birds. The most curious instance given is that of the bower-birds of Australia, who build bowers, and decorate them with much taste, solely for the purpose of pleasing their female partners during courtship. There is, also, good reason to believe that birds are gratified by the sweet strains of song poured forth during the same season. "Obviously no animal would be capable of admiring such scenes as the heavens at night, a

beautiful landscape, or refined music; but such high tastes, depending as they do on culture and complex associations, are not enjoyed by barbarians or by uneducated persons."

In regard to the belief in the existence of an Omnipotent God, the author finds no evidence that it was an aboriginal endowment of man. On the contrary, there is ample evidence that many races have existed and still exist, without any idea of a God or gods. Some sort of religion seems almost universal, but that is often merely a belief in unknown or spiritual agencies, good or evil. Such ideas are the natural offspring of curiosity, wonder, and a partial reasoning power. The belief would easily pass into a belief in one or more gods, as the intellectual and moral faculties advanced. The feeling of religious devotion is a very complex one, depending on both intellectual and moral faculties; yet something approaching this feeling is seen in the strong affection of a dog for his master; and some writers have maintained that the dog looks upon man as a god. It is admitted, however, that, of all the differences between man and the lower animals, the moral sense is by far the most important, and constitutes the noblest attribute of man. This the author considers the legitimate result of the social instincts, leading at first to a sort of selfish morality, which became gradually refined. Abundant proofs are given of the existence of true social instincts among animals, and these social feelings were probably first developed in order that those animals which would profit by living in society, should be induced to live together. "In many cases it is impossible to decide whether certain social instincts have been acquired through natural selection, or are the indirect results of other instincts and faculties." The remarkable instinct which leads some animals to place sentinels around the community has probably been directly acquired. The instincts or impulses that conduced most to the welfare of a class of animals would tend to increase through the influence of natural selection. In connection with the instincts of animals, attention is directed to the conflict between opposing instincts, in which the stronger one prevails, as for instance where a naturally timid bird faces great danger in order to gratify the stronger maternal instinct of protecting her young; and again, when the migratory instinct overpowers the maternal, and induces swallows to desert their young, and leave them to perish in their nests. Here the impulse most beneficial to a species would be rendered the more potent by natural selection, and those which had it most strongly developed would survive in larger numbers. The gradual development in man of the moral feelings is attributed to the activity of the mental facul-

which led him to reflect on past actions and their consequences. Moral being is one who is capable of comparing his past and actions or motives, and of approving or disapproving of them. There is no reason to suppose that any of the lower animals have this faculty." The lower impulses are the stronger at the moment when excited, but the higher feelings are more persistent, so that when man is yielded to the former simply to gratify himself at the expense of the latter, he will afterward feel dissatisfied with himself and resolve to behave differently in the future. This is conscience, which looks backward and judges past actions. Man thus acquires self-command, and subordinates his passions and impulses to his social sympathies; and perceives that it is best for him to obey his more persistent instincts. "The imperious word *ought* seems merely to imply the consciousness of the existence of a persistent instinct, either innate or partly acquired; serving him as a guide, though liable to be dislodged." The social virtues are supposed to be the result of experience. Tribes and communities could not have held together if there had been dishonesty among themselves, or if they had murdered each other with impunity. But these virtues were only relative, and limited to tribes who practised them. It was wrong to steal from one's own tribe, but to rob or kill an enemy might be deemed a virtue. Virtues do not obviously affect the welfare of a tribe, as temperance or industry, have never been highly esteemed by savages. According to the author's definition, then, the moral sense is "fundamentally identical with the social instincts." In concluding this subject the author asserts positively that the difference in mind between man and the lower animals, great as it is, is certainly one of degree and not of kind; that the faculties and emotions of man may be found, though often in a rudimentary condition, in the animals; that they are capable of a certain development thus gained, and that the improvement may be transmitted to their offspring.

In the chapter on the manner of development of man from a lower to a higher state it is shown that man is subject to great variations, both bodily and mental, no two individuals of the same race being quite alike. The differences in size, in features, in the courses of the arteries, and in the lungs and viscera, are dwelt upon at length, and eminent authorities are cited to give weight to the author's assertions. The same conclusion of variability prevails among the lower animals, and especially among those which have been domesticated. The supposed causes of variability are also considered, a very powerful one being the use and abuse of certain parts, and peculiarities thus induced are transmitted

and become more marked in each succeeding generation. The same rule is well known to apply to mental qualities and aptitudes. The arrest of development seen in the brains of idiots is referred to, and the monkey-like behavior of microcephalous idiots is considered a reversion to the habits of a remote ancestry. So also certain structures peculiar to the lower animals occasionally reappear in man. It is very unusual to find the uterus partially divided into two organs, as in some of the lower mammals. The malar bone, which in some of the quadrumana consists of two portions, is sometimes found in that condition in adult man. The canine teeth, as far as their proper function is concerned—that of tearing enemies or prey—are considered rudimentary, yet they are implanted by deeper and stronger fangs than the incisors. These teeth are occasionally developed to a great length in man, and it is remarkable that they project largely in the few ancient skulls that have been examined. Mr. Darwin says: “He who rejects with scorn the belief that the shape of his own canines, and their occasional great development in other men, are due to our early progenitors having been provided with these formidable weapons, will probably reveal, by sneering, the line of his descent. For, though he no longer intends, nor has the power, to use these teeth as weapons, he will unconsciously retract his ‘snarling muscles’ (thus named by Sir C. Bell), so as to expose them ready for action, like a dog prepared to fight.” Speaking of variations in the muscular structures, he says: “It is quite incredible that a man should through mere accident abnormally resemble, in no less than seven of his muscles, certain apes, if there had been no genetic connection between them. On the other hand, if man is descended from some ape-like creature, no valid reason can be assigned why certain muscles should not suddenly reappear after an interval of many thousand generations, in the same manner as, with horses, asses, and mules, dark-colored stripes suddenly reappear on the legs and shoulders, after an interval of hundreds, or more probably thousands, of generations.” It is maintained that these reversionary, as well as the strictly rudimentary structures, “reveal the descent of man from some lower form in an unmistakable manner.” The process of conversion from quadruped to biped is rendered clear by reference to the various kinds of monkeys, among whom there exist at present the several gradations between a form of progression strictly like that of a quadruped and that peculiar to a biped. As the progenitors of man became more and more erect, the author argues that the hands and arms became modified for prehensile purposes, and the feet and legs for support and progression. This, again, led to other

modifications, partly from inherited effects, and partly through natural selection, which caused the survival of the best individuals. At the same time the brain must have become largely developed, thus influencing the form of the skull and the supporting spinal column. The absence of tail is not distinctive of man, for those apes which come nearest to man are destitute of this organ; and among those which possess it there is a great diversity in its size and length, though it is not very clear how it has become modified or lost. Mr. Darwin admits that in the earlier editions of his "Origin of Species" he probably exaggerated the power of natural selection in regard to changes of structure. Modifications which are of no service to the race could hardly have been acquired through this means. Touching the objections urged by the Duke of Argyll and others, that man would have diverged from the brute in the direction of greater physical weakness and helplessness, the author believes that such disadvantages would have been more than counterbalanced by the development of the intellectual powers; and even supposing the early progenitors of man more helpless than any existing race of savages, if they had inhabited some warm continent or large island, they would not have been exposed to any special danger. "The competition between tribe and tribe would have been sufficient, under favorable circumstances, to have raised man, through the survival of the fittest, combined with the inherited effects of habit, to his present high position in the organic scale." The intellectual power of man enables him to adapt himself to the most unfavorable circumstances, and to anticipate future events, without the necessity, as in the case of the lower animals, of any marked changes of bodily structure. If, therefore, the intellectual faculties were of so great importance to primeval man and his ape-like progenitors, those faculties would have been advanced through natural selection. The tribes containing the greatest number of intellectual individuals would thus supplant or absorb inferior tribes. The development of the social qualities, leading to unselfishness and a desire for the general good, was also of great advantage to the dominant tribes, and morality has always been an important element of success. Why all races or tribes have not progressed alike in some degree is a question that the author discusses at some length, but it seems difficult to explain very satisfactorily, except by the general admission that progress is not the normal rule in human society. In this regard Mr. Darwin has been commonly misunderstood, for there is nothing in the theories he advances to militate against the possible retrogression of a race placed under unfavorable influences. Indeed, as nations become more and

more civilized, various circumstances incident to civilization tend to counterbalance the advantages due to intellect, such as the protection given to the weak and inferior members of society, and the consequent multiplication of worthless or non-productive individuals. "The reckless, degraded, and often vicious members of society, tend to increase at a quicker rate than the provident and generally virtuous members." Mr. Greg is quoted as saying, in illustration of this point: "The careless, squalid, unaspiring Irishman multiplies like rabbits; the frugal, foreseeing, self-respecting, ambitious Scot, stern in his morality, spiritual in his faith, sagacious and disciplined in his intelligence, passes his best years in struggle and celibacy, marries late, and leaves few behind him." On the other hand, there are shown to be counter-checks to this downward tendency, such as the increased mortality among the poor and squalid. It does not appear that corporeal structure, except so far as it leads to vigor of mind, has much to do with success in the struggle of races for supremacy. Natural selection is only one element of success, and instances are not wanting in which individuals and races, having acquired great and indisputable advantages through selection, have perished for lack of other essential qualities which they had not acquired. The remarkable progress of the people of the United States is regarded as the probable result of natural selection, the more energetic, courageous, or restless men from all parts of Europe having emigrated to that country for many generations. Mr. Darwin believes, however, that progress is much more general among all races than retrogression, and that man has risen by slow and interrupted steps from a lowly position to the highest in the scale of created beings. He does *not* believe that man was aboriginally civilized, and then suffered utter degradation, as is maintained by the Duke of Argyll and other opponents of the theories advanced in the "Origin of Species," and elaborated in the volumes before us.

The author then briefly recapitulates his arguments in favor of the origin of man by development from the higher animals, but he does not attempt to describe precisely when or where man first appeared. He thinks it probable that the stock whence man arose inhabited the Old World, and more probably the African Continent; and as to the time when man first became worthy of the name, he thinks it may have been as remote as the Eocene period. The wide gap that exists between man and his nearest allies seems no objection to the belief that man is descended from a lower form, for breaks incessantly occur in all parts of the series, as between the orang and his nearest allies. The gap between man and the ape is growing wider every century, as

savage races die out or are exterminated. The closest link at present is that between the Negro or Australian and the gorilla. At some not very remote period in the future it may be as wide as that between the Caucasian and some ape as low as the baboon. The absence of fossil remains is not deemed of much weight in the argument, for those regions most likely to afford remains connecting man with the apes have not yet been geologically explored. The author hopes, and thinks it probable, that we shall some day be able partially to restore the missing structure of our early "ape-like progenitors," by the aid of rudiments which man retains by reversion, and by the assistance of embryology and morphology. The following is the author's sketch of our ancestors: "The early progenitors of man were no doubt once covered with hair, both sexes having beards; their ears were pointed and capable of movement; and their bodies were provided with a tail, having the proper muscles. Their limbs and bodies were also acted on by many muscles, which now only occasionally reappear, but are normally present in the quadrumana. The great artery and nerve of the humerus ran through a supra-condyloid foramen. At this or some earlier period, the intestines gave forth a much larger diverticulum or cæcum than that now existing. The foot, judging from the condition of the great-toe in the fœtus, was then prehensile; and our progenitors, no doubt, were arboreal in their habits, frequenting some warm, forest-clad land. The males were provided with great canine teeth, which served them as formidable weapons." The physical characteristics of man's progenitors at a much earlier period are ingeniously conjectured, and it is made to appear probable that they were aquatic in their habits, the lungs being regarded as a modified swim-bladder. Man is thus traced back to the amphibians, and there is evidently no limit among living beings that may not be reached by the same process of reasoning. Here the author rests to take a brief survey of his work. "Thus," he says, "we have given to man a pedigree of prodigious length, but not, it may be said, of noble quality. The world, it has often been remarked, appears as if it had long been preparing for the advent of man; and this, in one sense, is strictly true, for he owes his birth to a long line of progenitors. If any single link in this chain had never existed, man would not have been exactly what he now is. Unless we wilfully close our eyes, we may, with our present knowledge, approximately recognize our parentage; nor need we feel ashamed of it. The most humble organism is something much higher than the inorganic dust under our feet; and no one with an unbiassed mind can study any living creature, however humble, without being struck with enthusiasm at its marvellous structure and properties."

In a chapter on the origin of the various races of man, the different opinions on that question are separately discussed, the author deeming it probable that all races are descended from a single primitive stock, and that the existing variety has been acquired, since there are in all races many evidences of a common origin; and many habits and traits of character are common to widely-separated portions of mankind. But natural selection is not deemed alone sufficient to account for the very material differences that exist. There remains, however, one important agency to consider, that of sexual selection, to which the latter and larger part of the author's work is devoted. It is not assumed that even this agency will account for all the differences between the races. "An unexplained residuum is left, about which we can in our ignorance only say that, as individuals are continually born with, for instance, heads a little rounder or narrower, and with noses a little longer or shorter, such slight differences might become fixed and uniform, if the unknown agencies which produced them were to act in a more constant manner, aided by long-continued intercrossing."

The principles of sexual selection are simple in themselves, though sufficiently complicated in the details of their operation. As the phrase "survival of the fittest" expresses briefly the law of natural selection, the phrase "propagation of the fittest" would nearly express the law of sexual selection. Superior males predominate over inferior ones in the struggles for the females, and the superior qualities of the successful male are thus transmitted to the progeny. As a general rule, there is a struggle among the males for the females, or else the female exercises some choice of her partner, being influenced by superiority in size, strength, or beauty. In either case the result is a more numerous and powerful offspring from the fortunate male than from his less-favored rival, and the augmentation in successive generations of the peculiarities of the male. Hence arose, according to Mr. Darwin, various weapons of offence or defence, which, in their earliest rudiments, gave the male some advantage over other males destitute of such organs. "In the same manner as man can improve the breed of his game-cocks by the selection of those birds which are victorious in the cockpit, so it appears that the strongest and most vigorous males, or those provided with the best weapons, have prevailed under nature, and have led to the improvement of the natural breed or species." It is pointed out that the slightest variation, if in any degree advantageous, would suffice for the work of natural selection. So also any variation in color or other quality of the male, which led to a preference by the female, would be continually increased. This supposes a certain faculty of dis-

mination on the part of the female, and this is proved to exist among many animals. In many cases the males are superior in numbers to the females, but this is not necessary to the success of the principle of natural selection. Much pains is taken to demonstrate the fact that courtship among certain animals, especially birds, is by no means a short or simple affair; and even when a certain male has vanquished his rival he may still be rejected by the female on account of some quality distasteful to her. The singular fact appears in the course of these investigations, that many animals which are strictly monogamous in their wild state, as the duck, become polygamists under domestication. But, whatever the habits of animals in this respect, the less vigorous males often fail to obtain partners, or else obtain less vigorous females and leave no offspring. The laws of inheritance in their bearing on sexual selection receive a lengthy consideration, in which many points favorable to the author's theories are set forth. The number of cases quoted, and of observations digested and utilized in the course of his arguments, furnish abundant proof of the immense labor that has been expended in this direction by Mr. Darwin. Several chapters are devoted to insects alone, showing the process of development of the various forms and colors under the influence of sexual selection. The vertebrates come next in order, and furnish many arguments to the ingenious author, whose points are admirably illustrated by the aid of drawings. Nearly two hundred pages are devoted to the consideration of birds and their peculiarities, in which it is shown that these bipeds are highly pugnacious during the breeding-season, and often possess formidable weapons for fighting. But, in addition to these, the males are furnished with special means for pleasing the females, sometimes by vocal sounds, as songs, calls, and cries; and sometimes with elegant decorations, including the most gorgeous ornamentation to be found in nature. These ornaments must be of vast importance, as they are often gained at the expense of the power of fighting, and even of convenient progression. The decorations are also more brilliant and attractive during the season of breeding, and are sedulously displayed before the females. To suppose all this display lost upon the female appears to the author incredible, and he demonstrates very satisfactorily that birds have often very fine taste and a high appreciation of colors and sounds. If this is admitted, the author sees no difficulty in perceiving how the points of attraction may be modified through sexual selection. It appears to us, however, that the marvellously regular activities of some of the feathered tribes cannot be clearly accounted for by the operation, through any conceivable length of time, of a pro-

cess so nearly akin to what we call accident. It is not difficult to imagine the development of weapons and other organs of use in a manner, but the production of an artistic beauty that challenges admiration of cultivated man can hardly be fairly attributed to the precious tastes of a multitude of birds, which, though it might result in beauty, would be very likely to produce almost as many varieties as the beautiful as of individual tastes. The author, however, comes to the conclusion that "weapons for battle, organs for producing sound ornaments of various kinds, bright and conspicuous colors, have generally been acquired by the males through variation and sexual selection, and have been transmitted in various ways according to the general laws of inheritance—the females and the young being left comparatively but little modified."

Proceeding to the discussion of sexual selection in mammals, it is shown that the male succeeds more through the law of battle than by the display of personal charms. Even animals naturally timid become courageous, and engage in desperate conflicts during the breeding-season, often severely injuring and sometimes killing each other. The males of wild animals very commonly show scars and other evidences of injuries thus received. In this connection a detailed account is given of the various weapons of offence and defence possessed by the larger mammals, with theories regarding their origin and mode of development, and their employment in warfare. It is maintained, however, that the preference of the female has also much influence in the pairing of mammals, and some curious and convincing instances of female choice among wild animals are given. The taste and antipathies shown by dogs and other domesticated animals are well known, though we are ignorant of the particular qualities that are most alluring to the females. The males of most animals are furnished with larger and stronger vocal organs than the females, and the voice is used very commonly in courtship. It is probable also that the glands of certain animals which emit a powerful odor are of service in attracting the females, besides being of use as a means of protection or offence. The development of these glands or sacs is checked by castration, and the secretion is often changed in character during the breeding-season. The growth and peculiarities of the hair are regarded in many cases as ornamental, conducing to the attraction of the sexes. As to the taste which would be attracted by the grotesque varieties of coloring in some of the animals, particularly the monkeys, the author thinks it merely necessary to allude to the absurd deformities which are admired by savages, and the gaudy patches of paint that are regarded by the

s eminently attractive and beautiful. In many cases, however, the color of the hair of animals is evidently due to natural selection, and serves purposes of protection from other animals, as do the green colors of certain birds and insects that assimilate them to the foliage in which they conceal themselves. The very strange colors of the hair on the face and head of some varieties of the monkey, Mr. Darwin believes to have been acquired through sexual selection. The rule appears to hold good among animals generally, that the darker and stronger colors, and more marked contrasts, belong to the male sex, and are most pronounced at and during the period of masculine vigor.

Coming at last to man, as the highest in the scale of created beings, the author gives a brief sketch of the differences between the sexes, physically and mentally, showing that they differ more than most species of the quadrumana. The points of difference are essentially the same in man and other of the higher animals. The male is larger, stronger, bolder, more energetic, and the brain is absolutely larger. Whether the brain in man is relatively larger has not been definitely ascertained. The same laws of battle, applied to man in times past, apply to-day to savages, as have been seen to exist among the animals, women being the constant cause of war. "There can be no doubt that the greater size and strength of man, in comparison with woman, together with his broader shoulders, more developed muscles, rugged outline of body, his greater courage and pugnacity, are all due in chief part to inheritance from some early male progenitor, who, like the existing anthropoid apes, was thus characterized." The strongest and boldest succeeded best in obtaining wives, and left the largest number of offspring. With regard to the mental differences between the sexes, woman differs markedly in tenderness and unselfishness. Having displayed these qualities toward her infants, she has strengthened them, and naturally extends them to her other fellow-creatures. The rapid perception and powers of intuition peculiar to woman are faculties characteristic of the lower races and of a lower stage of civilization. "The chief distinction in the intellectual powers of the two sexes is shown by man attaining to a higher eminence, in whatever he takes up, than woman can attain—whether requiring deep thought, reason, or imagination, or merely the use of the senses and hands. If two lists were made of the most eminent men and women, in poetry, painting, sculpture, music—comprising composition and performance, history, science, and philosophy, with half a dozen names under each subject, the two lists would not bear comparison." It is therefore assumed that the average standard of mental power in man is greater than that

of woman. This superiority is attributed to the transmission chiefly to the male offspring of the qualities that have been developed, through long generations, in the sex that had to bear the greater part of the struggle for existence. But the law of equal transmission to both sexes having commonly prevailed among mammals, the difference between man and woman is comparatively small. Had the law been otherwise, "it is probable that man would have become as superior in mental endowment to woman, as the peacock is in ornamental plumage to the peahen." A comparison is drawn between the vocal organs of man and woman. The sweetness of woman's voice may perhaps point to its early acquirement by woman as an attraction to the other sex. Indeed, according to the author's views, it seems probable that the vocal organs in both sexes were primarily used and perfected with direct relation to the propagation of the species. Insects, fishes, birds, and nearly all animals, produce some sound, and it is generally used during the season of courtship. Many animals show a decided fondness for musical sounds, and all savages indulge in a species of rude music.

The chapter on the influence of beauty in determining the marriages of mankind is especially interesting, as showing the vast differences in taste that characterize different races of man. The love of beauty, or what is so considered, appears to be universal. All races practise some arts of personal adornment supposed to add to their beauty; and by some savages great pains are taken to conform to the popular standard. Some shave the hair off, and others allow it to grow to a great length. The natives of the Upper Nile knock out the four front teeth, that they may not look like dogs. The face and other parts of the body are sometimes frightfully mutilated in the name of beauty. The curious sameness in many of the rude habits that prevail in remote and distinct nations indicates, the author thinks, a close similarity in the mind of man, and not the origin of all races from a common source. It is shown that each race takes a delight in the exaggeration of the qualities with which it is endowed by Nature. Beardless races pluck out every hair, while races having long beards carefully cultivate them. There appears to be no absolute standard of beauty, but each race prefers the form it is most accustomed to behold. There is reason to believe that types of superior beauty have arisen from the intermarriage of different races. The principal causes that would interfere with sexual selection are briefly enumerated, among them communism, or promiscuous intercourse; but, so long as choice is exerted before the parents unite, it is made clear that, as far as sexual selection is concerned, it matters not whether the union is temporary

permanent. The habit of marriage is admittedly obscure in its origin, but the author is very loath to believe that promiscuous intercourse as prevailed at any period when man deserved his name. "Man," says Mr. Darwin, "as I have attempted to show, is certainly descended from some ape-like creature." Now, it is shown that many species of monkeys are strictly monogamous, while others live in separate families; and still others in bands, having each one male as their chief. The latter is looked upon as the probable condition of the earliest men and women. Among savages to-day some of the lowest tribes are monogamous, but polygamy is the rule. An intelligent Kandyan chief "was perfectly scandalized at the utter barbarism of living with only one wife," which he said was "just like the Wanderoo monkeys." Among the most curious of savage tastes regarding beauty is the fancy of Hottentot men for women in whom "the posterior part of the body projects in a wonderful manner." These extraordinary men are said to choose their wives by seating the women in a row and selecting the one who projects farthest *a tergo*. The blackness of the skin of the negro the author believes may reasonably be attributed to sexual selection, since the negroes admire their own color, and as the males of all mammals, where there is any difference in color, are darker than the females.

It is frankly admitted by Mr. Darwin that the views he advances regarding the part which sexual selection has played in the history of man lack scientific precision; but he believes that further investigation will confirm them in the main, and that "of all the causes that have led to the differences in external appearance between the races of man and to a certain extent between man and the lower animals, sexual selection has been by far the most efficient."

The grand object of the author throughout the two volumes before us is to demonstrate the fact that man is descended from a less highly-organized form of being. To this end all his facts and arguments are steadily directed, and, though he admits that many of his views are highly speculative, it cannot be denied that the weight of evidence and probability favors the theory of development. The strongest arguments of Mr. Darwin are based on the well-known and remarkable similarity between man and the lower animals in embryonic development, upon similarity in structure and constitution, and upon the rudiments which man retains of extinct organs found in perfection lower in the scale. These are striking facts that cannot be ignored. But it is not so easy to believe with Mr. Darwin that all the vast difference, intellectually and morally, between man and his brute brethren can be

accounted for by development alone. That there are many difficult and mysteries connected with the origin of man, even in the light of Mr. Darwin's theories, is candidly admitted by Mr. Darwin himself, who fully expects that some of his speculations will be found erroneous but he has given the evidence, as he says, to the best of his ability and without any desire to draw unwarrantable conclusions. Anticipating the repugnance that some persons must feel toward a system that endeavors to demonstrate the kinship of man and brute, the author declares that he would as soon be descended from a brave and affectionate monkey as from a cruel and blood-thirsty savage. The religious bearings of Mr. Darwin's views are foreign to the argument, but they need not alarm the enlightened Christian, albeit they demand some sacrifice of the pride man feels in finding himself at the summit of the scale of created beings. The fact of his having risen to that position, says Mr. Darwin in his concluding chapter, instead of having been aboriginally placed there, "may give him hopes for a still higher destiny in the future."

This pamphlet¹ is one of the first-fruits of the change made in the by-laws of our State Medical Society, at its last meeting, by which members are permitted to publish papers read by them before the Society, in advance of their publication in the Transactions. There may be sufficient reason for the long delay in publishing these Transactions, but the change in the by-laws was imperatively called for. Medical writings do not, like wines, gain in value by keeping, and a writer can afford to wait from one to two years for the appearance of his paper. The volume of Transactions for 1870 is now more than a year overdue. When that for the current year may be expected, it would, of course, be quite useless to conjecture.

It is a little curious that, at the time when the tendency to divide medicine into specialties had become most marked, the first important efforts were made to bring a specialty which had long stood apart into closer relations with medical study and practice. The leaders of this movement found the general practitioner almost entirely unacquainted with mental disorders, and his knowledge of cases often limited to the formalities necessary for a commitment to an asylum. As it is well understood that, whatever can be done for insane patients by medicine

¹ The Dependence of Insanity on Physical Disease. By John P. Gray, M.D. Superintendent of the New York State Lunatic Asylum. Read before the Medical Society of the State of New York, at its annual meeting, February, 1871. Utica 1871.

must be done in the earliest stages of their disorder, there was reason to believe that serious consequences often resulted from delay in treatment. On the other hand, it appeared doubtful whether the kind of treatment to which such cases were subjected, when they were treated at all, was not at least an equally serious evil. A class of remedies which had, one after another, been discredited in nearly every form of bodily disease, were still given in the old "heroic" style in mental disorders.

Nor did the need of reform appear in the general profession only. Superintendents of insane asylums were too much occupied with the administrative details of their office, to the neglect of its professional duties. How little time they gave to careful study and scientific observation, appeared from their writings. These were indeed mostly in the form of annual reports, addressed to a non-medical public, but they bore unmistakable evidence that their authors lived outside the sphere of medical thought and discussion. The psychological theories they set forth were generally little else than the assumptions of phrenology, clothed in the language of a spurious metaphysics. Their statistics, and the conclusions based upon them, were too often a mere caricature of scientific methods. As to therapeutics, it seemed that experience had led to a proper distrust of the old routine treatment of insanity; but here progress had rested, and the use of medicines for the insane was nearly abandoned.

The movement for reform of which we have spoken, though begun by the German psychologists, was quickly followed in France and Great Britain. In this country, we believe Dr. Gray was among the first to call to it the attention of the profession. His address before the State Medical Society in 1868 was chiefly devoted to this purpose, and the present essay is clearly intended to contribute to the same end. It certainly could not have been expected that the writer would furnish in himself the example with which to enforce his appeals. But we are obliged to utilize the paper chiefly in this way. It seems to us replete with vital errors in psychology, and its important applications to medical and social science.

In the first place, we have to point out a fundamental mistake in the writer's conception of psychology itself. It is certainly important that authorities in psychological medicine should know clearly what the modern science of psychology is. It is neither more nor less than *the science of mind considered as a physical function*. That mind is a spiritual entity, which uses the brain as its instrument, is the primary assumption of metaphysics. "The habit of viewing mind as an in-

tangible entity," says Maudsley, "which science inherited from theology, prevented men from subjecting its phenomena to the same method of investigation as other natural phenomena." And he finds in this habit the reason why insanity remained so long a special study and art, "quite aloof from general medicine in a mysterious and mischievous isolation."¹ But Dr. Gray expressly adopts the metaphysical theory of mind, and writes in its defence with all the ardor, and some of the arts, of an advocate. Among the latter, is an effort to cast odium upon the physical theory by terming it "materialistic," and charging its supporters with "an attempt to revive the exploded vagaries of the French materialism of the encyclopædists and the revolution." It is also wildly described as a "purely conjectural theory, which militates against moral order and social welfare no less than against the common-sense of mankind." After a quotation from Cabanis to prove "that the introduction of materialistic theories even into the domain of psychology is nothing new," the writer says further: "Recently Dr. W. A. Hammond, of New York, in a work on 'Sleep and its Derangements,' has reasserted this old theory, and expresses his views of mind in the following language: 'Writers who contend for the doctrine of constant mental activity, regard the brain as the organ or tool of the mind; a structure which the mind makes use of in order to manifest itself. Such a theory is certain to lead them into difficulties, and is contrary to all the teaching of physiology. The full discussion of this question would be out of place here; I will, therefore, only state that this work is written from the stand-point of regarding the mind as nothing more than the result of cerebral action. Just as a good liver secretes good bile, a good candle gives good light, and good coal a good fire, so does a good brain give a good mind. When the brain is quiescent, there is no mind.'"

It may be freely admitted that Cabanis, and other physical inquirers of the eighteenth century, were disposed to push their theories beyond the limits of scientific inquiry, and to deny, with no little of the dogmatic spirit, the validity of any other principles and method than their own. All this, however, has no bearing upon the psychology of to-day. It has always been an impulse of the highest philosophy, of which no one has even dreamed that it "militates against moral order and social welfare," to believe in some real though infinitely incomprehensible unity of the universe. What we are conscious of as mind, and what we are sensible of as matter, may, indeed, be only the subjective and objective faces of one unknown and unknowable reality.

¹ *Body and Mind*, Amer. edition, p. 12.

at these questions lie fully beyond the sphere of scientific investigation. We might safely challenge Dr. Gray to point to the name of a single authority, in any department of physical science, who pretends to identify mind and matter, or believes in the possibility of this being one. It is a universal postulate of the scientific world, that we can have no knowledge of the nature of either matter or mind. Yet we are at perfect liberty to view either of these as the function or manifestation of the other. As Huxley says: "Matter may be regarded as form of thought; thought may be regarded as a property of matter. Each of these has a relative truth." To regard the mind as nothing more than the result of cerebral action is, then, a legitimate working hypothesis; which is all that is claimed. The doctrine which the writer takes so much pains to controvert has been repudiated by science for at least half a century. There is no one to maintain against him that "mind is a mere secretion of the brain, depending upon its existence, and sickening and dying with it." That "the mind, the spiritual principle, the immortal being, cannot be the subject of disease," is another proposition which, in the present age, nobody will think it worth while either to affirm or deny.

But we have anticipated a little. Dr. Gray's metaphysical doctrine and criticism do not appear at the beginning of his essay. On the contrary, the natural preference of the physician for physical theories is here brought most strongly into view. He says:

"Since my connection with the asylum, now over twenty years, I have endeavored to direct my attention and study, as far as possible, to the investigation of the causes of insanity, and the observation of the progress of the disease while under treatment. I early observed that, in those cases of which full and reliable information could be obtained, the physical cause was generally found; that some change in some part or parts of the organism preceded the earliest manifestations of mental disturbance; and that in those cases some diseased condition of the body, outside of the brain, generally preceded the cerebral symptoms and the consequent insanity. In my official report for 1863, I presented this subject with the intention of showing, from the recorded cases in that institution, the relation, numerically, where moral and physical causes had been attributed as the influence determining the insanity. I there presented a tabulated statement, embracing the signed causation in all cases admitted up to that date, with comments, signing, as moral causes, those acting through the emotions, sentiments, passions, affections; as physical, those producing their effects through physical impairment, diseases, or injuries. In 1843, Dr.

Brigham says, 'With Pinel, Esquirol and Georget, we believe that moral causes are far more operative than physical.' In his first report he assigns moral causes in 128 cases, physical causes in 93 cases, unknown and doubtful in 55 cases."

"Of the moral causes 50 are attributed to religious anxiety. I then expressed my conviction that more careful observation would reveal physical causes as productive of more insanity than moral causes, and that religious excitement and anxiety had but slight influence in this direction. The annexed table embraces the analysis of causation, moral and physical, in all cases admitted up to this date."

The table referred to shows more than twice as many cases due to moral as to physical causes, in the admissions to the asylum in the year 1843, and a gradual change in this proportion down to 1866, in which year 263 cases are attributed to a physical, and 12 only to a moral origin. Since 1866, it appears that no cases at all have been set down as due to moral causes. Upon this point Dr. Gray remarks:

"These and kindred causes were recognized less and less as efficient influences in the production of disease, during the lifetime of Dr. Brigham, under the light of experience. The first year religious anxiety represented in the table of causes 18.15 per cent., the second year 9.81 per cent., the third year 8.15 per cent., the fourth year 5.99 per cent., the fifth year 7.22 per cent. and the sixth year (the last report made by Dr. Brigham), 6.40 per cent. There was also equally marked diminution in other supposed moral causes, and increase in physical. Thus we perceive that more extended experience and more careful observation of these cases, revealed the existence of disordered physical health as the efficient cause of insanity, and the religious depression or other moral manifestations as only exciting causes, or as incidental effects. This established, was an important advance. Rest, nutrition, medication, could then be presented in truth as the relief of sorrow. The decrease of religious anxiety as an attributed cause of insanity has, therefore, not been because people have been more or less religious at one period than another, or that new religious views have in the mean time been advanced. It is simply because of the steady progress of medical knowledge, deduced from patient investigation, intelligent observation, and careful analysis of facts."

We are sorely puzzled to determine in what, if any, precise sense Dr. Gray treats of the "causes" of insanity in these quotations. At the outset we are compelled to suppose that the physical cause "generally found" by him, was the pathological condition of which the insanity was only a symptom. By that "change in some part or parts

of the organism," observed in connection with mental disorder, we do not indeed suppose is meant any specific tissue-change upon which sanity necessarily depends. From what we know of the nature of brain and nerve function, such an essential lesion is not within the bounds of possible discovery. But to learn what various structural changes or definite pathological states are oftenest associated with insanity, and to express the laws of this association in the classification of cases, are, of course, among the most important problems of the medical psychologist. What light is Dr. Gray prepared to shed upon these points, as the result of his twenty years' observation and experience? Has he found any connection between a certain type of mental disorder and a bodily disease, such as Dr. Clouston claims to have discovered between monomania of suspicion and tuberculosis? Do special abuses of the appetites bring on special trains of bodily and mental symptoms, as Dr. Maudsley believes he has found of the habit of masturbation, and as Dr. Blandford claims in respect to sexual excess? It is not doubted that distinct morbid states result from the ordinate use of alcoholic drinks, or that insanity is much more common among inebriates than among the temperate. But can a definite relation between these states and certain types of mental disorder be shown, so as to warrant us in setting up one or more morbid species? Certainly, unless something be added to our knowledge in this manner, the proposition which Dr. Gray is so fond of repeating, that "insanity is a bodily disease," becomes as useless as it is a formally unscientific hypothesis. For the word insanity clearly does not belong to physical science, and—as stated in a passage which he quotes from Herbert Spencer for another purpose—"science ceases to be such when it reports into its interpretations of physical processes," a metaphysical term. It is known, moreover, to every scientific physician, that these pathological states which are loosely called the causes of disease, are really the diseases themselves. What is wanted, then, to bring the cases now classified as insanity under the head of bodily disease, is to link morbid mental phenomena with true pathological states. Of the effort to do this there is too little in the present essay, and that little far from being satisfactory. The only morbid condition of which Dr. Gray writes as the cause of insanity, is that of anæmia. Now, we must doubtless be content for the present to admit anæmia as the designation of a class of mental disorders based upon pathology. The insanity of nursing mothers, of convalescents from fevers, and of some other patients in whom scanty and impoverished blood is the sole morbid condition, may properly be placed under this head. And in

respect to this condition the views of perhaps most experienced alienists have changed in the manner which Griesinger has described of himself. In the first edition of his celebrated treatise, too much importance, as he admits, was attached to hyperæmia as a cause; but in the second edition,¹ sixteen years after, he had come to attribute to "the very variously modified anæmia states the greatest weight in the production of insanity."

No one, however, could be more conscious than this great writer how unsatisfactory, in a scientific sense, is such an origin of mental disorder. In the first place, anæmia is in too many cases a condition obviously depending upon some primary disease, as tuberculosis, syphilis, carcinoma, or Bright's disease. We do not properly speak of hemiplegia as a cause of insanity, but refer rather to the lesion of which the paralysis is only symptomatic. And, secondly, we have to remember that as only one of many thousands of anæmic patients in a community is found insane, it must always be in a high degree conjectural to attribute insanity to this cause. These considerations will make the scientific inquirer very careful not to refer any case to anæmia when a more definite morbid state can be found, or unless this origin is clearly pointed to by the history. Yet in the four cases which Dr. Gray gives to exemplify this origin, our attention is directed to nothing except the bare fact that anæmia was present in all. Nor can we help noticing that one of these was a case of acute mania, one of chronic mania, one of melancholia, and the last, only of dementia. For while it is true that quite different forms of mental symptoms may depend upon a single pathological state, yet it is well known that dementia is that very generally found associated with anæmia. A still further reason, however, compels us to regard the writer's pathology as too vague and conjectural to be of any real value. While offering no other evidence than that the four patients were "all feeble and anæmic" for the dictum, "we say the mental phenomena are due to the anæmic condition of the brain," he says finally: "However, the cause to be truly assigned in these cases is the generally depressed health inducing the anæmic state of the brain and nervous system." Now, we cannot agree with Dr. Gray when on another page he declares that, if in a single instance insanity appears in connection with "a well-recognized bodily disease, and the mental disturbance disappears *pari passu* with the physical restoration, the argument is

¹ Mental Pathology and Therapeutics, New Sydenham Society's edition, p. 191.

incible." The danger of the fallacy *post hoc ergo propter hoc*, in an inference, is too great to be left out of sight. But the pathology which rests in "generally depressed health" as its physical basis, duly comes within the limits of serious criticism. What should we think of a theory of paralysis or other disorder of motion or sensation which referred the morbid symptoms to a similar source?

Another theory, which Dr. Gray adopts from Schroeder van der Kolk, is indeed scientific in form, but to divide insanity into idiopathic, that which has its origin in the brain, and sympathetic, or that which arises from disorder in other parts of the body, is merely to open the door for vagueness and conjecture. To prove this, we have only to show it furnishes "the fundamental starting-points" which Dr. Gray takes "it may be safely assumed that experience has given us" towards the elucidation of mental disorders:

"1. Disease of any part of the organism may be the pathologic cause of insanity." The word "pathologic" is clearly inadmissible in the sentence. If in truth any morbid change in any part of the body can be the cause of insanity, its pathology is impossible.

"2. In such cases insanity is not manifested until the brain is fully involved." If the insanity is not manifested until a structural change in the brain occurs, this change must be considered the pathological cause of insanity. If that in which the brain is "actually involved" is only a functional change, insanity is such change, and the sentence may read: "Insanity is not manifested until insanity is manifested."

"3. Disease of the brain or its membranes may be the primary exciting cause of insanity, and other parts of the organism subsequently become affected."

What is it with which other parts of the organism subsequently become affected?

"4. Insanity more frequently has its primary origin in pathologic changes outside the brain, than in primary diseases of the brain."

This is another and by no means a better way of saying that insanity is oftener sympathetic than idiopathic; which it is impossible now, and which indeed has no useful meaning to be known.

"5. There are physical symptoms and signs of brain-diseases which experience has enabled us to recognize as pathognostic [query, pathogenic or diagnostic] of certain brain-changes, by knowledge of which we are able to anticipate and understand the progress of cerebral diseases."

This may all be very true as stated, but there is nothing in it which lies to the subject of insanity.

That we have not been mistaken in supposing Dr. Gray to have had pathological conditions chiefly in view when writing of the causes of insanity, is still further apparent when admitting that cases are often the result of grief, anxiety, and other moral states, he says: "Even here, however, the cause is physical, because insanity comes on only as a result of defective nutrition in the tissues, those of the brain included." This shows also that the steady increase of physical causes in the asylum records is purely a matter of change in theory, and has but little to do with "the progress of medical knowledge deduced from patient investigation, intelligent observation, and careful analysis of facts."

And yet it is perfectly plain, from Dr. Gray's annual reports, that the statistics of twenty-seven years, upon which his paper is based, do not register pathological causes alone. We find in these reports, as in those of most other asylums, internal states and external circumstances, physical and moral agencies, predisposing and determining conditions, all given without distinction as causes. The observer has apparently set down at times the most immediate, and again the supposed most potential morbid event in the chain of causation. Very few, in fact, of these attributed causes refer to the pathological condition. Some are physical, some are moral; others are neither of these, but simply fanciful and impossible. It is needless to say how entirely worthless such statistics are. Drs. Bell, Ray, Brown, and other authorities, have expressed no uncertain opinion upon this point.

It really seems to us that if the writer's purpose had been to exhibit this worthlessness in the strongest possible light, he could hardly have selected a better method than the one taken. He has tabulated for us the admissions of twenty-seven years solely to illustrate two divisions of causes, one of which he finally concludes has no existence. Among these cases—divided between physical and moral, but which remain physical only—are those due to heredity, which is neither a physical nor a moral cause, yet is the most productive of any. "Insanity," says Dr. Ray, in a late paper,¹ "is generally the work of at least two generations, and the more thorough our investigations of the antecedents of our patients, the larger will be the proportion found to originate in this manner." The truth is, that only the least important class of causes, the external and accidental circumstances which light up the train already prepared, are capable of the division of which Dr. Gray makes such a singular use. And of these we believe with Pinel,

¹ American Journal of the Medical Sciences, April, 1871, p. 532.

nirol, and Georget, not only, but with the latest authorities, such as Maudsley, and Blandford, that the moral are much more numerous and important than the physical. This was also the opinion of Dr. Brigham, and not only at the beginning of his observations, but under the light of experience." We are surprised that his views on this point should be so entirely misunderstood by one who has the best means of knowing what they really were. In his last report—from which Dr. Gray quotes, as we have seen, to prove the contrary—Dr. Brigham says: "We believe that moral causes are far more operative than physical." And his figures seem to have been quite as honestly dealt with as his opinions. From the above statement he goes on to point to 92 cases out of 1,630 admitted in six years, whose causes had been ascertained as "about all we can attribute to physical causes." This shows the relative importance of physical and moral causes, in his experience, to be as 1 of the former to 16 of the latter. Dr. Gray's tables these same cases are very nearly equally divided between the two classes of causes. It is plain that, for some unexplained reason, almost one-half the cases observed and recorded by Dr. Brigham have been changed from the moral to the physical side of classification. This seems to us worse than trifling with the legacy of an honest and independent observer, who, although holding physical causes much more extreme than those to which Dr. Gray gives the epithet of "materialistic," was too clear-minded to suppose that moral causes must be denied in order to save the argument for pathology and medical treatment. Dr. Gray not only believes, with what reason we are unable to learn, "that physical causes are more within the power of the individual and the profession" than moral, but—what is far more extraordinary—that the nature of the cause, as moral or physical, determines the form of the insanity, and the remedies for it. "To discover, then," he says, "under such supposed moral causes, that the true source of the disease lies in physical disorders, is equivalent to substituting sleep, food, and medication, for moral reasonings and difficult and complicated theological problems, and thus to bring the case within the range of medical skill." And again: "Think of having, within a single year, fifty persons whom you believe to be insane from religious frenzy, and those from all Christian denominations! What a store of pathological knowledge the physician must possess, and what subtlety of reasoning, to meet all these cases!" We assure our readers there is nothing in connection with these sentences to indicate that they are to

¹ Sixth Annual Report of the New York State Lunatic Asylum, p. 40.

be read in any other than their obvious sense. Yet, it is difficult to believe that they were soberly addressed to fellow-members of the State Medical Society. Certainly, every physician must know that rest, food, sleep, and medicines, are used in mental disorders without regard to their moral or physical origin. Nor is it possible for any one, at this day, to suppose that treatment by "moral reasonings and difficult and vexed theological problems" is warranted in insanity of any origin whatever. It is well known, also, that the exciting causes of an attack are by no means necessarily reflected in its type. Nothing is more common, according to our own observation, than for painful emotions to cause a joyous mania.

Finally, while we have a strong conviction that the true road to a medical knowledge of insanity is through pathology, to leave mental phenomena out of psychological medicine altogether, as Dr. Gray attempts to do, seems to us unscientific, and in every way uncalled for. Can he have fully realized the truth of the declaration, which he quotes approvingly from Prof. Rolleston, that "psychical manifestations are facts in as true a sense as any other?" At any rate, he has failed to see that it is the aims and methods of physical science, which are essential to psychology, and not its preference for physical facts merely. How little, indeed, there is of true science beneath this extreme devotion to physical facts, may be seen from the following questions:

"1. Whether there are specific changes in the brain in insanity, and if so, whether there are any means of ascertaining, positively or proximately, what those changes are?

"2. Are there physical signs and symptoms indicating the presence and progress of such changes, which may be detected and relied upon, and what these are?

"3. Are there *post-mortem* appearances in the brains of those who die insane, which would justify the assumption that morbid cerebral changes were the potential and only ultimate causation of insanity?

"4. Are there any sound reasons for an assumption that the mind can overthrow itself, independent of cerebral changes?

"5. Do the secretions of the skin, kidneys, etc., throw any light upon the morbid condition of the brain in insanity, either regarding its pathologic state, its nutrition, or action?"

These inquiries are proposed to point the directions in which we are to seek to increase our knowledge of morbid psychology. Is it too much to say that they show the most vague and erroneous notions of that science, and are based upon no rational or articulate theory of any kind? To our own judgment, at least, they are mere psychological conundrums, and as such we give them up.

INSANITY' in all its protean types is a subject upon which medical men are least informed of all the branches of medicine, yet we doubt much if there be a disease in the whole field of medical literature which is more interesting to study, more formidable to the friends of the patient, or more disastrous in its results, when not treated early, than the affection in question.

There is, perhaps, no disease the general practitioner desires less to understand and to treat than this, which he is every now and then obliged to encounter in his own private practice, simply because he feels ill-prepared to take charge of such a case, and this very feeling of ignorance causes him to be very desirous to shirk not only the medical responsibilities, but also the legal.

Now, this want of knowledge upon such an important subject as insanity is to be explained from the fact that there have been, until recently, very few text-books written in the English language, in which a general practitioner could acquire such a reasonable amount of information, in a moderate space of time, as would enable him to have a general idea of insanity, its treatment and its medico-legal relations. Although rich mines of literature, with their legions of books, in which have been discussed in detail the theoretical problems of insanity, and in which the practical results of its clinical study have been clearly delineated, have been ever available to all the educated members of the profession, yet so voluminous was the subject that the general practitioner was deterred from attempting to unravel its mysteries, and has awaited with patience the results of the specialist who had devoted his whole life to this particular branch of science. Recognising and appreciating full well this deficiency, Dr. Blandford has made an effort to supply a text-book, in as condensed a form as possible, which would furnish to the student and practitioner a good, commonsense, practical view of insanity and its treatment, and in this respect he has very happily succeeded. The work is a concise compilation from the leading authorities, and although the author makes no pretence at originality, yet we cannot but admire the plain and intelligible manner in which the book is written; the careful separation of wheat from the chaff, which marks the master-hand throughout.

Insanity and its Treatment: Lectures on the Treatment, Medical and Legal, of Insane Patients. By G. Fielding Blandford, M. D., Oxon., Fellow of the Royal College of Physicians in London; Lecturer on Psychological Medicine at the School of Medicine, George's Hospital, London. With a Summary of the Laws in Force in the United States on the Confinement of the Insane. By Isaac Ray, M. D. Philadelphia: Henry C. Lea, 1871, 1 vol., 8vo, pp. 471.

We commend this work to the profession as a first-class book, fulfilling all the conditions for which it was written, better than any work of the kind in the English language. The pathology, physiology, and morbid anatomy, are merely spoken of in outline, yet the facts advanced are recent and up to the times, and are sufficiently clear to be comprehended easily. The whole tone of the book displays the good taste of the author.

In speaking of the classification of insanity, the author remarks as follows: "Classifying not the disorder, but the patients, I would reverse the order suggested by the committee of the Medico-Psychological Association, and note in the first place the mental symptoms observable at the time of inspection, and afterward assign to these their pathological significance, if the history or the symptoms enable us to do so."

The classification of the different forms of insanity is at present very imperfect, owing to the fact that the symptoms or mental phenomena alone furnish the basis of that classification. If, however, by means of certain mental symptoms, we are enabled to ascertain the pathological lesion which gives rise to these phenomena, we shall have approached nearer the first cause; and if we now name the mental disorder, not from prominent symptoms, but from this lesion, it seems as though we should have a more tangible foundation upon which to rest our knowledge, a clearer idea of the seat and course of the different changes which produce so many and varied mental manifestations.

But unfortunately very little is known of the minute changes which take place in the nerve-cells and neuroglia of the brain, and consequently nothing is left for us but to wait and adhere to the old classification of mind, according to the mental peculiarities or the disorder of the parts, into which it is divided by some authors, until we become better acquainted with the brain-pathology. Every writer has his own particular division, and that division is based solely on what he considers the most efficient cause of the disease or its most characteristic symptoms. In all the different classifications, not excepting those of Drs. Morel, Maudsley, Skae, and Tuke, there appears to be one of these two forms above mentioned, chosen according to the idea of the writer, but how much more these new divisions of insanity will be of advantage to the student, and assist him, than the old time-honored division of Esquirol, we fail to see. In a few years all this will be changed, for already the subject of brain-pathology is receiving much attention both in this country and in Europe, and only very recently minute microscopic changes have been discovered in the nerve-cells and

glia of those who have died insane; and now that attention has directed to this important point, we are in hopes that it will be ed with the same care and the same degree of success as the mi-anatomy of the spinal cord has been.

We quote from the author the following remarks in regard to the on of phthisis to insanity :

From my own experience I should say that there is no more tuber-is among these (meaning thereby insane persons who have never in an asylum) than among the non-insane world." Again, the or seems to incline strongly to the belief that phthisis among the ie is due to asylum influences, and that there does not necessarily any connection between phthisis and insanity. This is an entirely rent view from that which has been advanced and taught by oeder van der Kolk and others.

We are glad to see that the author lays so much stress upon heredi-predisposition as the really efficient cause of insanity, and accepts experience of others that the nervous condition may be indicated by overt insanity in succeeding generations, but by any other form ie diseases of the nervous system. "Two laws of Nature are con-ed in the production of these phenomena. One is, that peculiari-and abnormalities are apt to recur in descendants for many genera-; the other, that there is always a tendency to return to the type ealth, in beings which have sufficient vitality to perpetuate their ence and carry on their race for successive generations. We d not breed an insane family of which all the members should be ie for generations. We should have sterility and extinction, or a n to a healthy type." It is the opinion of Dr. Blandford that ity is greatly on the increase in Great Britain among the lower es, and this is undoubtedly true, as the statistics show such to be fact. This he attributes mainly to the excessive use of alcohol, ough he mentions other well-known causes. Again, the insane erament, which has been so beautifully described by Dr. Maudsley a little volume on *Body and Mind*, receives another able supporter e person of Dr. Blandford. One point we are pleased to see put so ightly by the author, and that is, the necessity there is in certain forms anity, such as acute delirious mania, melancholia, acute primary entia, etc., for the use of stimulants, for it has ever been a popular ion, derived undoubtedly from the older writers, that alcohol ld never be used in any form of insanity, as its employment was ht with great danger. What an erroneous doctrine this is, is to ferred from the fact that in certain forms of insanity our only reli-is upon food and alcohol.

It is often asked, Can there be insanity without delusions? A delusion was formerly considered the test of insanity according to the legal interpretation, but the views of the author upon this point are so very clear and satisfactory that we would advise the reader to peruse them carefully, and we will not discuss them here.

Although we do not agree with Dr. Blandford upon some not very essential points, yet we would not on that account detract from the praise to which he is so fairly entitled for presenting to the student and practitioner a book well worthy their study.

The summary by Dr. Isaac Ray, M. D., of the laws in force in each of the several States of the Union on the confinement of the insane, will be found very useful to those who are not acquainted with the legal form necessary to be gone through in order legally to commit a patient to an asylum.

THE Physical Cause of the Death of Christ¹ would seem at first thought a difficult and somewhat singular subject on which to write a volume of over four hundred pages, such as that before us; but, granting its importance in relation to the principles and practice of Christianity, it must be admitted that the author has treated his subject in a very learned and exhaustive manner. Dr. Stroud has now been dead for thirteen years, and, though highly accomplished in his profession, he devoted much time and study to theological questions, and contributed largely to theological literature. The present volume, however, is considered his masterpiece, and he informs us in the preface that he had the subject in his mind for more than a quarter of a century. He does not claim entire originality for his views, but endeavors to furnish demonstration of facts which had previously been only matters of conjecture. The principal point insisted upon is, that the death of Christ was caused by rupture or laceration of the heart. Sir James Y. Simpson, who had read the author's treatise and various comments on it, expressed himself very positively in favor of the views maintained by Dr. Stroud, which he believed to be of the highest importance in enabling Christians to appreciate the immensity of the sacrifice made for them on the cross.

The evangelical narrative of the death of Christ is first critically reviewed, and the author then proceeds to dispose of the erroneous suppositions as to the immediate cause of death, showing that it was

¹ The Physical Cause of the Death of Christ, and its Relation to the Principles and Practice of Christianity. By William Stroud, M. D. With a Letter on the Subject by Sir James Y. Simpson, Bart., M. D. New York: D. Appleton & Co. 1871.

due to the wound inflicted by the soldier's spear, to an unusual of bodily weakness, nor to supernatural influence, but, on the y, to agony of mind, producing rupture of the heart. The in the garden of Gethsemane is said to have been alone sufficient to have caused death had it not been "limited by divine interpo-

Its effects, however, were confined to violent palpitation of rt, accompanied with bloody sweat. This same agony was re- on the cross, and, being allowed to proceed to the utmost, caused of the heart, as shown by the discharge of water and blood he side was subsequently pierced. A host of anatomical and ogical facts are quoted in order to prove the possibility of an bloody sweat, followed by dilatation and rupture, in consequence ase emotions. A number of well-authenticated cases are re- to in which the whole body has discharged blood instead of and in which life has been suddenly extinguished from rupture ventricles of the heart, owing to violent mental emotions. It is monstrated that this natural and adequate agency was present erative in the case of Christ. The ordinary sufferings in cru- are not sufficient to cause death in six hours. The victims irvived three days, or even longer. The death of Christ at the six hours is therefore ascribed to extreme agony or struggle be- the desire of deliverance from the sense of divine malediction : desire of fulfilling the will of God by endurance even unto That He possessed energy, both of body and mind, to the last, nt by His loud and fervent exclamation immediately before He . All the circumstances are thus shown to be compatible with of the heart, followed, as a natural consequence, by effusion of nto the pericardium, and sudden suppression of the circulation. lden death surprised the soldiers who were sent to dispatch the l persons, and, suspecting probably that Jesus might not be ead, one of them inflicted a decisive wound, that is, a stab to t. The flow of blood and water is accounted for by supposing er the rupture there was a discharge of blood from the rup- eart into its enclosing capsule, and that this blood had separated solid and liquid constituents—crassamentum and serum. The obably pierced the lower part of the left side, opening the peri- obliquely from below. The contents would thus be discharged l stream of clear, watery liquid, intermixed with clotted blood, ed in the narrative. The interval between the death of Christ : piercing of the side is estimated at two hours, which is con- sufficient for the separation of the solid and liquid constituents

of the extravasated blood, but not sufficient for the coagulation of that portion of the blood still remaining in the heart.

The second part of the volume is occupied with an elucidation of scriptural truth from the foregoing explanation, and deals from a strictly orthodox point of view with the doctrine of atonement, the prophecies, symbols, and narratives of the Old Testament, the precepts of Christianity and the evidences of its truth, concluding with an earnest appeal to the unconverted. The sole fact of interest to the medical reader is the pathological one already stated, and that, except in its theological bearings, is of very little practical importance.

THE fifteen articles composing this volume¹ are collected from various sources, the greater part of them having been previously published in English periodicals. They include, also, the most remarkable of the lectures and addresses delivered by the author, whose characteristic style is evident in every page. No living scientific man has succeeded so happily as Prof. Huxley in rendering science popular. He is thoroughly independent in his views, and very impatient of all dogmatic restraints upon the liberty of thought, yet he presents new thoughts and startling views in such a clear, winning, humorous manner, that even those who reject are delighted to listen. In these "Sermons" we find some of Prof. Huxley's best work, though he admits in a prefatory letter that he has outgrown some of the opinions set forth in his earlier articles. He has not thought fit, however, to make any alterations, but lets each essay tell its own story; and we are glad that he has done so, for we can thus mark some of the advances that have been made within a few years. It would be difficult to find more entertaining reading anywhere than the most of these essays, which abound at the same time with thoughts and suggestions eminently practical, and the most stirring incentives to mental exertion. His sermon on "A Liberal Education, and where to find it," was delivered before a working-men's college, and is a brief analysis of the system of education commonly pursued, pointing out with extraordinary clearness the radical defects of the usual college course of training. He shows that the things for which the student has need in after-life are precisely those which are neglected, while the memory is stored with a mass of useless learning. He is far from underrating the value of a classical education, but he insists that the students do not get even that. He

¹ Lay Sermons, Addresses, and Reviews. By Thomas Henry Huxley, LL.D., F.R.S., author of "Man's Place in Nature," "Origin of Species," etc., etc. New York: D. Appleton & Co., 1871.

: "That man, I think, has had a liberal education, who has been reared in his youth that his body is the ready servant of his will, does with ease and pleasure all the work that, as a mechanism, it is capable of; whose intellect is a clear, cold, logic engine, with all its parts of equal strength, and in smooth working order; ready, like a steam-engine, to be turned to any kind of work, and spin the gossamer as well as forge the anchors of the mind; whose mind is stored with a knowledge of the great and fundamental truths of Nature, and the laws of her operation; one who, no stunted ascetic, is full of life and fire, but whose passions are trained to come to heel by a strong will, the servant of a tender conscience; who has learned to love all beauty, whether of Nature or of art, to hate all vileness, and to treat others as himself. Such a one, and no other, I conceive, has had a liberal education." He then asks where such an education can be obtained among our schools and colleges. Another essay is devoted to scientific education and its importance, and still another to the educational value of the natural-history sciences. After an able lecture on the study of Zoology, we come to the celebrated one on Protoplasm, or the Physical Basis of Life. Notwithstanding all the facts stimulated by this lecture, the author sees no reason to change. Another paper deals with the scientific aspects of Positivism. One more, to workmen, is On a Piece of Chalk, and discloses the treasures of Nature stored away in that apparently insignificant object. Addresses are upon Geology, and two review-articles on the Origin of Species. In the latter Prof. Huxley throws much light on some of Darwin's theories, acting as interpreter between the high-priest of science and the multitude. The finest essay of all, in our opinion, is on Descartes' Discourse touching the Method of using one's reason rightly, and of seeking Scientific Truth, delivered before the Young Men's Christian Society, at Cambridge. The closing article is on Spontaneous Generation, being the address made last year before the British Association for the Advancement of Science.

THE title of this volume¹ sufficiently indicates its general character. In Prof. Huxley's book, it consists of a variety of essays, lectures, reviews, having for their principal object the education in scientific matters of unscientific people. Mr. Tyndall has made himself very

Fragments of Science for Unscientific People: A Series of Detached Essays, Lectures, and Reviews. By John Tyndall, LL.D., F.R.S., author of "Heat as a Mode of Motion," "Lectures on Sound," etc., etc. New York: D. Appleton & Co. 1871

popular by his talent for imparting simple truths, and disrobing science of its mysteries. Many writers who devote themselves to this praiseworthy task are open to the suspicion of being themselves superficial in their attainments; but this cannot be said of either Huxley or Tyndall, who have both gained their highest renown in the purely scientific world. The author tells us in his preface that the impulse to gather up these fragments came from America, and he, therefore, dedicates the book to his friends in the United States.

Among the subjects of the essays, to which space does not permit us to refer in detail, we find Matter and Force, Prayer and Natural Law, Miracles and Special Providences, Materialism, Heat in its Relation to Color, Life and Letters of Faraday, Magnetism, Death by Lightning, Science and Spirits, Dust and Disease, etc. Perhaps no one article that Mr. Tyndall has ever written provoked more discussion or awakened more interest than that on Dust and Disease, owing to its direct bearing on the subject of contagion and the propagation of disease-germs. The author has made some additions to his original article on this interesting subject, and gives in full detail the steps of the process by which he arrived at his conclusions.

DR. STORER'S treatise on Reflex Insanity¹ has already been for some years before the profession. The present volume is a reprint, without any material alterations, from the published proceedings of the American Medical Association for the year 1865. The necessary authority to republish the paper was obtained in 1867; but the author delayed the issue of his work in hopes of finding time to enlarge and amplify it, as he deems the subject one of vast importance, and hitherto much neglected by those who have devoted their attention to insanity. Not having found the hoped-for leisure, he is content to present the paper as it is, dedicating his book to the members of the Gynæcological Society of Boston, whom he styles, with rather questionable taste, "thoughtful, working, fearless gentlemen, already a power in the land." As these gentlemen are not accustomed to hide their light under a bushel, such flattery by a member of their own Society would appear superfluous, to say the least of it.

The point enforced by Dr. Storer in his able argument is, as most of our readers are aware, the connection between some organic or func-

¹ The Causation, Course, and Treatment of Reflex Insanity in Women. By Horatio Robinson Storer, M. D., LL. B., of Boston. Boston: Lee & Shepard. New York: Lea, Shepard & Dillingham, 1871.

of uterine disease and mental derangement. Having very strong opinions on this subject, and being avowedly a gynæcological specialist, he may be pardoned some enthusiasm, we had almost said generation, in the detailed treatment of a favorite topic.

THE author of the admirable little volume entitled "Diseases of Rectum" is already so well known to the profession and the public that it seems hardly necessary to more than mention his name in order to insure the character of his book. No one in this country enjoyed greater advantages, and had a more extensive field of observation in this specialty, than Dr. Van Buren, and no one has paid the same amount of attention to the subject. It is on this account his views are of value and will be highly esteemed. There is the experience of years summed up and given to the professional world in a plain and practical manner. There are larger works on this subject, such as Curling, Brodie, and a host of others, but they have the disadvantage of being less recent than the book of our author, and consequently they are not as well up with the times. We especially commend to the writer the great importance which he attaches to things which, though seemingly trivial in themselves, yet are so very essential to the diagnosis and proper treatment of disease; as these have been so highly valued and worthy of respect by himself, we trust they will be appreciated by others.

The object of the author has, we think, been fully attained, inasmuch as he has very happily succeeded in these lectures in furnishing many practical hints which will no doubt be of great utility.

Lectures upon Diseases of the Rectum, delivered at the Bellevue Hospital Medical College, Session 1869-'70. By W. H. Van Buren, A. M., M. D., Professor of Principles of Surgery, with Diseases of the Genito-Urinary Organs, etc., Bellevue Hospital Medical College, one of the Consulting Surgeons of the New York Hospital, of the Bellevue Hospital, Member of the New York Academy of Medicine, of the Pathological Society of New York, etc. New York: D. Appleton & Co., 549 and 551 Broadway, 1870 12mo, pp. 164.

CHRONICLE.

I.

PHYSIOLOGY AND PATHOLOGY OF THE BRAIN AND NERVOUS SYSTEM.

TRANSLATED BY DR. J. OSMUN.

- 1.—*Of the Electric Irritability of the Cerebrum.* G. FRITZ and E. HIRTZIG. (Reichert & DuBois's Archives, No. 3, 1870. Psychiatrisches Centralblatt, January, 1871.)

THE experiments which this paper describes show, on the one hand, the indefensibility of the opinion that all direct irritations of the cerebrum are inoperative; on the other hand, however, the knowledge of the localization of the functions of the brain is greatly increased by the author's researches. The fact recognized by Meynert, as the result of his anatomical and pathological inquiries, that the motor functions are chiefly seated in the anterior portion of the cerebrum, is substantiated, physiologically, by the author's experiments.

By applying a weak current to the anterior portion of the cerebrum of a dog, the authors produced muscle contractions, and that, too, at distinctly defined and always uniform points in animals on which they experimented. The same group of muscles, on the opposite side, always contracted.

As a counter-experiment, those points in the brain which had been found, by electrical irritation, to be motor centres for certain groups of muscles, were extirpated in other dogs. For example, a piece of brain, as large as a pea, was removed from that point from which, by means of the electric current, the muscles of the foreleg could be made to contract. The consequence was, that the animal, although it could move the muscles of the leg, no longer had the power to keep the foot in normal positions—it continually turned to one side.

- 2.—*The Independence of the Sympathetic.* Prof. SCHIFF. (Giornale l'Impargiale, x., 1870. Psychiatrisches Centralblatt, January, 1871.)

The question, whether the sympathetic is dependent on or independent of the brain and spinal marrow, is still unsettled.

As this important problem cannot be solved by anatomical or pathological facts, Prof. Schiff has had recourse to physiological experiments. The first question he asked himself was, What are the functions of the sympathetic?

Molinelli and Petit, as early as the last century, discovered what influence the sympathetic had on the eye. Valentine and others subsequently confirmed his statement, that the division of the cervical portion contracted, while its irritation dilated the pupil. Wagner showed, further, that in the first case the eyeball sinks somewhat deeper into the socket; in the second, on the contrary, it becomes more prominent, as in exophthalmus.

lge and Waller showed that the irritation of the cilio-spinal in the spinal cord produced the same phenomena as the irritation of the cervical portion of the sympathetic, and thus demonstrated the fact that it had its origin in the spinal marrow. Schiff goes further, and shows that the division of the medulla oblongata produces the same phenomena as the division of the cervical portion of the sympathetic, and thus that the medulla oblongata is the seat of these phenomena.

Another function of the sympathetic is, according to Valentine's experiments, the vasomotor contraction of the capillary vessels. The pressure increases if the nerve be irritated, and decreases—the vessel being enlarged—if the nerve be divided.

In the exception of the cases in which the nerves of the spinal cord exert a vasomotor influence, Schiff endeavors to show, by experiment, that we can trace the origin of the vasomotor action, ascribed to the sympathetic, to the central cerebro-spinal system.

As to the influence of the sympathetic on the heart, Schiff demonstrates emphatically.

The peristaltic motion of the intestines can also, says Schiff, be produced by irritating the dorsal portion of the spinal cord, according to the manner of effecting the irritation. This influence, however, is lost when the splanchnic nerve is divided.

As to the part the sympathetic plays in nutrition and the secretory process, Schiff considers the first a chemical process, upon which the influence is only indirect. The latter takes place in many of the glands under the influence of the nerves of the spinal cord; in the case of the salivary glands the secretory process is arrested by the influence of the sympathetic, because in this case the nerve-fibres of the sympathetic effect the contraction of the vessels, run into those of the central nervous apparatus, which effect the dilatation of the vessels. But, Schiff believes he has shown that all rise in the medulla oblongata, and thus no doubt that here also the sympathetic can only be considered as a conductor of the functions exercised by the medulla oblongata.

It is undisputed that psychical acts are determined by the brain. When we ring a dog and a cat together, their psychical irritation is manifest, more especially therein that the hair of the dog on his back, or on her tail, stands up. Now, if we destroy, in the cat, the lumbar portion of the spinal cord, and bring her together with a stranger, the hair of the tail will still rise. If we leave the spinal nerves intact and divide, on both sides, the abdominal portion of the sympathetic, the hair of the cat's tail will remain smooth, even though she is tickled by a dog.

On the Central Vein-pulse in Epilepsy and Kindred Conditions.—by KÖSTL and NIEMETSCHKE. (Prager Vierteljahrschrift, 1870, and the Psychiatrisches Centralblatt, January, 1871.)

This paper represents only a part of the researches undertaken by the authors to illustrate the value of the ophthalmoscope in cases of

psychosis. To this end, they examined, in 250 individuals, 468 eyes. They found the venous pulse in 66 eyes belonging to 36 patients, who were epileptics, or were afflicted with some ailment akin to epilepsy.

A detailed history of these cases is communicated. The authors divide them into three groups :

1. Those with genuine epilepsy, 12 in number, of which 10 had strongly-marked maniacal tendencies.
2. Those afflicted with a disorder akin to epilepsy, 17 in number.
3. Those in which there was no indication of epilepsy discoverable, 7 in number.

The ophthalmoscopic examinations in these cases showed :

1. In a few instances there was an opacity of the lens, which was chiefly in the substance of the lens, partly in the form of little opaque dots and partly as lines radiating from the centre. Partial opacity of the lens-substance was more frequent in the cases of the second group.

2. Anomalies of refraction. Eleven of the number were hyperopic. In the eye of one patient, who had an inveterate epilepsy, the remains of the membrane of Wachendorf were found, which justified the conclusion that development had been imperfect.

3. Myopia in two cases.

4. Maceration of the pigment. In 16 cases, the vessels of the choroid were sometimes only indicated, and sometimes visible, in consequence of the disappearance to a greater or less extent of the pigment epithelial cells, which may be considered a part of the retina. All of these cases, with one exception, were incurable.

5. Changes in the appearance of the papilla :

- a.* Anomalies of form. The form of papilla was generally normal ; in two cases only were there good grounds for suspecting a congenital abnormality in this particular. In one of these the papilla was irregular in shape, in the other it presented the figure of a vertical rhombus.

- b.* Changes in the level of the papilla. Excavation of the optic disks was found 12 times in nine patients. In some cases it was central, in others peripheric. A portion of them were doubtless congenital.

- c.* Anomalies of size. In only one instance was the papilla found to be remarkably small.

- d.* Anomalies of color. In anæmic conditions, the grayish red of the papilla was pale, so pale, indeed, on the outer half, that in some instances the lamina cribrosa could be seen. In 6 cases one-half, in 9 cases a third only of the papilla, was found normal in color—grayish red.

The cause of the brain-anæmia was either a general anæmia, or it was due to local conditions and manifested itself in the eye by pallor of the papilla.

Two patients, in whom the papillæ were not whitish, but gray, suffered from symptoms of brain-atrophy. These symptoms were more marked in the patient in whom the gray was present in both papillæ.

6. Succulence of the retina. In 10 cases, which presented the phenomena of a general anæmia, the examination showed, nevertheless, a turgidity in the retinal vessels in consequence of their being over-

filled—a reactive hyperæmia, following the anæmia, with dilatation of the veins and optic capillaries. The central veins were all distended, some more, some less. In no case were they small. The ectasis of the central veins, the surcharged condition of the optic capillaries, and retinal turgescence, also characterize the reactive hyperæmia.

Special attention should be called to the fact that in most cases, where turgor retinæ exists, and the prognosis is favorable, no change is found in the pigment epithelial cells.

In old, incurable epileptics, distention of the central arteries and contraction of the central veins are usual.

7. Central vessels of the retina. They were often in contrary conditions with regard to size, the arteries being small and the veins large, and *vice versa*.

Large central arteries characterize severe cases of epilepsy.

Large veins are often found in reactive hyperæmia, and are a favorable diagnostic sign.

8. The vein-pulse. The cause of this phenomenon should be looked for, according to the authors, in the general anæmia of the body, or in the local anæmia of the head, as every thing that lessens the pressure of the blood in the internal carotid may cause a vein-pulse.

The anæmia of the retina manifests itself most frequently by the pulse-phenomena in the veins; then, if the pressure be increased, by the pulse of the arteries.

The vein-pulse was not found in equal intensity in all of the thirty-six cases, and not always in both eyes. It is remarkable that the seat of the vein-pulse is more frequently in the left eye.

The paper ends with the following *résumé*:

1. The vein-pulse is produced, when the eye through extra- or intra-ocular pressure becomes anæmic.

2. If anæmia of the eye arises—which manifests itself by the pallor of the papilla, by a general deficiency of blood, or by an insufficient supply of blood in the internal carotid—it is accompanied by a vein-pulse. For this reason these phenomena appear in epilepsy and kindred ills in which anæmia of the brain is the cause of the disease.

3. In the lower grades of anæmia, the patients suffer from occasional blackness before the eyes, from vertigo, and temporary loss of consciousness. The more marked the anæmia, the more marked the impotence of the organ affected. In the eye the power to see is arrested, in the brain to feel, will, and think. The patient remains for a longer time unconscious.

4. In anæmic patients, a reddish discoloration of the papilla, enlargement of the retinal veins, and a swelling of the retinal tissue, are found.

This condition can only be considered as a sign of a hyperæmia following the anæmia. A low grade of reactive hyperæmia is attended by pain, cramps, increased irritability, and mental excitement. A high grade is characterized by convulsions, hallucinations, and insanity.

4.—*Electricity in Psychiatry.* Dr. RUDOLF ARNDT. (Archiv für Psychiatrie, II. Bd. u. 3. Heft, und Psychiatrisches Centralblatt, February, 1871.)

Our earliest knowledge of the use of the electric current dates back to the beginning of this century. But the observations relating to it were not numerous, and those that we find reported are, in many instances, wanting in scientific accuracy. It was not until after Duchenne, in 1850, made his experiments known to the public, and he was followed by Meyer, Remak, Du Bois-Reymond, Pfüger, and Heidenheim, that experiments were made, in asylums for the insane, with the electric current.

In 1859 Drs. Teilleux and Auzouy, of Maréville, published their experience, in the *Annales Médico-psychologiques*, with the electric current in the treatment of mental diseases.

The experiments that have been described, till now, were made with the rotation and induction apparatus.

For the first accurate knowledge of the applicability and curative powers of the galvanic battery in diseases of the mind we are indebted to Prof. Benedikt [*Electrotherapie*, 1868].

Encouraged by the few facts discovered by Prof. B., Dr. Arndt has undertaken to obtain more reliable data for the application of electricity in psychoses. He was specially prompted to make this attempt by his success in treating a case of progressive paralysis by Faradization.

Arndt undertook a series of experiments, with the Faradaic current, on the insane, but he met with no success. Melancholy and anxiety were alike increased until he was compelled to desist from experimenting further. The action of the current was also unfavorable in secondary forms. In cases of apathetic imbecility, fainting was frequent.

On the contrary, Arndt obtained favorable results in cases of simple primary or secondary depression. He arrives at the conclusion that the induction current exerts a strong exciting influence on the central organs, and in all cases of primary psychical disease, in which we have to do with increased irritability, it is contraindicated. It should, also, not be employed in secondary cases, which are characterized by a high grade of irritable weakness. It is useful only in cases of simple depression accompanied by disturbance of the functions.

In cases when, in consequence of psychical depression, the breathing-process is superficial and insufficient, the Faradization of the phrenic nerves was resorted to.

The action of the induction current, according to A., is not unlike that of cold baths and douches—like these, it is an irritant. It is never tonic, still less has it any specific action.

The author now considers this action of the constant current, which exerts a radical influence, changing the functional and nutritive conditions. After explaining the manner of producing the constant current and the physiological laws according to which it acts, he comes to the consideration of the points at which the current should be applied. If he does indorse the opinion, that psychoses should be considered as diseases of the brain, he nevertheless believes a common basis should be established by which the individual cases can be judged. This com-

mon basis Arndt thinks he finds in the delicate molecular changes in the brain, which changes are manifested by the greater mobility of the molecules and increased impressionability, and cause that peripheric or central irritation—not of the cortical substance of the brain, but only the spinal cord or medulla oblongata—which produces psychoses, and that in the majority of cases of mental disturbance a serious brain-affection grows out of this spinal trouble. Hence the galvanic current should be applied to the peripheric nerves, to the spinal cord, and medulla oblongata.

As for the peripheric or central application, it will hardly ever be possible to apply the current peripherically only.

On the contrary, in connection with the treatment of the spinal cord, it may be applied peripherically there, where the psychosis appeared with or after a neuralgia, and is sustained by it, and there, when the ruling symptoms are aggravated with the appearance of peripherical affections, palpitation, oppression of the heart, spasms of the larynx, etc. It should be limited to the spinal cord, when the peripheric affections are wanting, or may be considered as eccentric projections.

The galvanizing of the head, otherwise the brain, which till now has been followed by few encouraging results, should, according to Arndt, be restricted to cases in which the object is only to produce a temporary or a tranquillizing effect.

Finally, the galvanic battery may be tried in those cases, also, in which the affections of the spinal cord are caused and maintained by a disease of the peripheric organs.

For the special application of the galvanic current all the circumstances should be specially considered. In order to give this maxim a practical basis, the author communicates *in extenso* several cases.

The galvanic current acts very favorably in those cases of psychical disease in which the cerebral symptoms may be traced to vaso-motor disturbances. In those cases also, where material changes have taken place, not unfrequently an improvement may be effected.

5.—*Rib-fractures in the Insane.* GEORGE HEARDER and Prof. GUDDEN. (Journal of Mental Sciences, January, 1871. Archiv für Psychiatrie, II. Bd. 3. Heft, und Psychiatrisches Centralblatt, February, 1871.)

Hearder informs us that in the Carmarthen County asylum, during 1870, twenty autopsies were made, and in each case the condition of the ribs and sternum was carefully examined.

In eleven cases they were found normal, in nine cases, however, in a pathological condition—the bones being more or less brittle. They would break under the pressure of a finger, and could be easily cut with a knife. In a few cases, the spongy substance, at the points where they broke easily, had nearly disappeared; in its stead a cavity filled with thin pus was found.

The fractures produced on the bodies were incomplete—the periosteum remained intact, the bones retained their positions, and could not be made to crepitate.

In three cases, the sternum was diseased and abnormally friable at one and the same point, namely, at articulations of the second and

third ribs. This pathological condition of the bones of the chest is not a concomitant of any particular form of mental disease; it may appear at any age and in either sex.

The rib-fractures, that here and there occur in asylums for the insane are, therefore, only rarely to be ascribed to the mistreatment of the guardians, and it is, says Hearder, remarkable that rib-fractures are not more frequent among restless patients, if we consider the frequency of this diseased condition of the bones. This circumstance speaks for the care and efficiency of the guardians.

Prof. Gudden, several years ago, called the attention of the medical profession to the frequency of rib-fractures among the insane, and published the result of his own observations, together with that of some of his colleagues.

In one hundred autopsies—fifty each of males and females—rib-fractures were found in sixteen cases. Of these sixteen, two only were women.

Of the fourteen men eight were paralytics.

In four cases only one rib, in twelve several ribs, were broken. In one case fourteen, in another twenty-three, and in a third thirty fractures were found.

In a few cases only were the fractures fresh or tolerably fresh; the majority were so old that no opinion could be formed of their date.

With the rib-fractures, the remains of bloody tumors were frequently found.

Concerning the osteomalacia, Gudden says that, in a moderate degree, it is not so very rare among the insane. A case of general softening of the bones, with thirty rib-fractures, in a woman seventy years of age, came under his observation.

The fractures are usually first discovered at the autopsy, and then, in most cases, they are old.

Rib-fractures are produced:

1. By falling or running against something. But Gudden has observed no cases in which the fractures were traceable to these causes.
2. The patients injure one another.
3. In some instances, the fractures are the result of mistreatment on the part of their guardians.

With regard to those fractures the patients sustain in the asylums, Gudden remarks at the close of his paper, that the more intelligent, attentive, and gentle the guardians are, the more absolute their control and the less they resort to force, the less rib-fractures there will be.

6.—*Subcutaneous Injections of Morphia in the Treatment of the Insane.* Dr. O. WOLFF. (Archiv für Psychiatrie, II. Bd., 3 Heft, and the Psychiatrisches Centralblatt, February, 1871).

The author has endeavored to develop the subcutaneous use of morphia into a general or systematic method of treating insanity. His incentive was the fact that morphia exerts a powerful influence on the vasomotor nerves, which play an important part in the pathological changes that take place in cases of psychosis. The nearer he made

on to the vasomotor centre, the more powerful he hoped he effect, and, indeed, the result of injections into the neck, r and lateral portion, was most marked as well toward the lessening the psychical irritability, as toward the periphery, he pain.

opinion of the author, the mishaps experienced in the ad- have tended to prevent a systematic method for the use of as morphia-injections being adopted. These mishaps, with on of the empty fear of tapping a vein, which should not vantageously, are twofold. The unfavorable effects appear mediately after the injection, or (and these are the more dan- dents) about two hours afterward. In the first instance, it pend on the dose injected; it seems rather to be the result ct injury of a nerve. The patient becomes unconscious, iff and rigid, the face cyanotic, the respiration difficult. It to raise the patient up, and to bend the head forward. ould be put to bed with the head propped up. In a few e muscles relax, the respiration becomes regular, and in a he patient regains consciousness.

ond class of unfavorable phenomena follow relatively or oo large doses. In the first hour, the pulse of the patient ed, and the temperature of his body is increased. In the ro hours, he begins to be restless, and finally sinks pale and the ground. At first he can be aroused, but later he lies nmovable, with his eyes and mouth half open. The tem- s fallen several degrees, the pulse is weak and slow, the in- nly from three to four a minute, are followed by expirations long. Venesection in the neck to the extent of a few ounces the surest means of saving the patient's life. As it is of the ortance to facilitate the exchange of the gases in the blood, be taken to promote perspiration, and not suppress it by covering. It is well to empty the bladder, to prevent its the pelvic veins.

d such accidents on the one hand, and to obtain the desired e other, the sensitiveness of different individuals to morphia onsidered. Experiment has shown, that small doses irri- rate—the pulse; that large doses, on the contrary, weaken — pulse. When, however, a patient has naturally a slow pulse, will easily do that which, in another, with a rapid pulse, be done with large doses.

ral, old persons should be treated with small, and youthful h larger doses. Further, in all cases where there is a cere- bro-spinal paralysis, small doses must be employed, and r doses must be resorted to with extreme caution in all there is a fatty degeneration of the heart, which interferes urt's action. At the beginning the dose is, with a slow pulse, a rapid pulse, $\frac{1}{2}$ gr. These quantities may be cautiously s the patient becomes accustomed to the remedy, to $1\frac{1}{2}$ These quantities are to be given, as a rule, *pro die*, that injection is not to be given until the effects of the first

have wholly disappeared. Of these effects, the most notable is vomiting, which is not only not injurious, but is often beneficial. The irritability of the patient disappears in the course of a few days; injections must not be immediately discontinued; they should be continued for a time, with gradually-decreased doses.

In the treatment of recurrent (circulärer) forms of insanity, tolerable or large doses are to be employed on the first appearance of any premonitions of an attack, be they mild or violent. If the attack has already set in, the treatment should be begun with an injection of from $\frac{3}{4}$ to $1\frac{1}{4}$ gr., and at intervals of from two to three hours to follow it up with one, two, and if necessary three "auxiliary injections" in decreasing doses. In this manner the majority of maniacal paroxysms may be broken.

A prophylactic employment of morphia-injections is based upon the observation that intercurrent, seemingly sudden attacks in mental diseases, even if their acme is very short, still are several hours or days in appearing and disappearing, during which periods, accidents may hasten or renew the attack. Besides the injection, therefore, which is intended to calm the patient during the attack, it is advisable to inject a smaller quantity of morphia, on the following day, in order to prevent a recurrence.

The action of the morphia will be promoted by warm baths and a purgative.

Finally, in most cases where morphia-injections are of no avail, chloral hydrate will be found useful.

7.—*Observations of Ampullaceous Ectases of the Blood-vessels.* Dr. R. ARNDT. (Virchow's Archives, vol. ii., No. 4, and the Psychiatrisches Centralblatt for February, 1871.)

Dr. Arndt had an opportunity to examine microscopically the above-named ectases on the brain of a man twenty-nine years of age, who died in the Greifswald Asylum for the Insane. He was tabetic, and in the course of the disease became aphasic.

This latter condition was ascribed to changes that were found, at the autopsy, to have taken place in the left frontal portion of the brain. The cortical substance (Markmasse), as far as it is formed of the fibrous threads (Faserzügen), that descend from the third frontal convolution (Windung), was traversed through and through by aneurismally enlarged vessels, so that the section was extraordinarily porous. One of the enlarged vessels that took its origin in the pia mater of the gyrus fornicatus, where it was not larger than a hair, was enlarged to the size of a raven's quill; its walls were thick, irregular, and in some places grown together. The other vessels were not so much enlarged, but their dilatation extended to the capillaries, where they appeared in numberless bottle-shaped formations. It was these formations that Arndt subjected to a microscopic examination.

In some cases they were colorless, surrounded by a fibrous net, in others marble gray, in others again deep red, or red with yellow spots.

Arndt found further that this formation was unquestionably connected with the vessels; that, indeed, in reality, it bulged out from the

larged capillaries in the form of pustules or bubbles, which were, as ready stated, of various colors—red, gray, colorless, and speckled. They were the same bottle-shaped ectases, and the question was, how the various forms they presented were produced.

The more minute examination showed that the red bulges (*Ausstülung*) were lateral enlargements of the capillaries (*Capellarrohrs*), with the enveloping adventitia; that the marble-gray, together with the colorless bulges, were enlargements of the adventitia only. In the first case they were filled with lymphoid corpuscles; in the second case the bulges consisted of a thin membrane, and seemed to contain nothing but lymph, without any lymph-corpuscles.

The circumstance that Arndt saw the capillary vessels proper, at the points of enlargement, intact, argues that the adventitia enclose a lymph-cavity.

The fibres between the lymph-corpuscles Arndt believes to be coagulated lymph. The bubble-like (*blasenartig*) formation, enveloped in a bundle of fibres, he looks upon as the result of a degeneration, which underlie the ampullæ. If we except these degenerations, Arndt, as the result of his examinations, recognizes in the capillaries three forms of ectases:

1. One in which the whole capillary wall, the capillary canal (*Rohr*) and the adventitia, are at the same time bulged out (*ausbuchten*) and blood is found in the bulge—complete ampullaceous ectasis.

2. A form in which the adventitia only are bulged out, and in the bulges lymph and lymph-corpuscles only are found.

3. A form, which is something between the two. Both membranes bulge out in a measure independently, and in different degree.

These two latter forms Arndt characterizes as incomplete ampullaceous ectases, and the first of the two as adventitial ectasis.

8.—*Of the, till now, Unnoted Influence of the Nervous System on the Temperature of the Body and on the Circulation.* R. HEIDENHEIM. *Pflüger's Archiv*, iii., 10, 11, and the *Psychiatrisches Centralblatt*, February, 1871.

If a sensitive nerve be irritated, no matter how temporarily, electrically or mechanically, the temperature everywhere sinks in the interior of the body. This influence of the sensitive nerves on the temperature depends on the medulla oblongata (*das verlängerte Mark*), for a separation of the medulla oblongata from the pons Varolii makes no change in the phenomena; not so, however, a division between the medulla oblongata and medulla spinalis. Further, direct irritation of the medulla oblongata with electricity, or by suspending the breath, produces a like effect on the temperature. As the temperature sinks, the pressure of the blood, in both the arteries and veins, is perceptibly decreased.

The author's experiments show that the irritation of the vasomotor nerves not only increases the blood-pressure in the vessels, but also increases the rapidity of the circulation. The return, therefore, of the blood cooled in the lungs and at the surface is hastened, which accounts for the decrease of temperature internally.

9.—*An Undescribed Anomaly of Motor Limitation.* Dr. FRIEDRICH FIEBER. (The Psychiatrisches Centralblatt, February, 1871.)

This paper relates to the following case:

J. D., aged forty-two, was received November 29, 1869, into one of Dr. Fieber's wards, in the Würzburg Hospital. He had always been well until the winter of 1866, when, according to his account, consequence of living in a damp house, he was attacked by darting pains in small of the back, which were followed by weakness, and increased sensibility in both right, and finally in both left extremities. The patient was received into a hospital at Prague, where it was found that he could walk but slowly, and with very short steps; that the electrical muscular contractility and sensibility in the right upper and in both lower extremities were diminished.

After three weeks' treatment with the galvanic current, the patient was discharged much improved.

The malady becoming again aggravated, the patient was received into the Würzburg Hospital.

Dr. Fieber found his muscles well developed. The features of the face seemed immobile, stony. His speech was abrupt, rare, and measured. His movements reminded the observer of a puppet or pendulum.

His intelligence was intact. His organs of sense, chest, and abdominal viscera, were normal.

There were points at which he experienced pain, accompanied with a feeling of pressure—between the spinal column and the anterior spine of the ilium.

His humor was calm, serious, not changeable as in hysteria virilis. The farado-muscular contractility seemed normal; the galvano-muscular gave different results.

As for the voluntary movements, the chief peculiarity was a certain desire to change. The muscles of the face contracted normally, but slowly. The head could be turned in every direction, but more easily to the right, when the patient walked backward, than when he walked forward. He could stand firmly with closed eyes. Disturbances of coördination and cutaneous anæsthesia were nowhere present.

He could execute all the movements of the body, but only slowly and with great exertion, especially when he lay on his back, and turned over, or on his side. When he went to bed, he invariably stood up on the foot and let himself fall, holding himself quite rigid. Upward movements of the arms were impossible. Both biceps were slightly contracted. The strength of the arms was not materially diminished, but violent exertion produced clonic spasms. The movement of the individual fingers was not difficult.

Most remarkable were the motility anomalies of the lower extremities. The patient's steps, when he walked, were short, his gait steady and certain, but very slow. He could not walk fast, but he could run with great nimbleness. When he ran, however, his feet were about three times the usual distance apart. He could easily change his direction and stop without difficulty.

The patient was materially relieved by giving him a weight of say, 10 pounds to carry, especially in the right hand. Thus loaded he could walk rapidly and firmly, and the upper extremities were visibly freer in their movements. Later he was compelled to urinate every 10 hours, more or less; if he did not, he urinated spontaneously, with dull pain.

The sexual functions were impaired. His appearance was anæmic.

Dr. Fieber now endeavors to explain this case. While he refrains, for the present, from an attempt to localize the disturbances anatomically, he seeks to account for them pathologically by supposing that an abnormal irritation exists, which manifests itself by a continual desire to be in motion. To this desire is opposed the well-known regulating action of the lobes of the brain. When, however, the latter fail to cause a movement, the check is wanting, and an abnormal irritation and the will unite to cause an exaggerated action. In this way it is conceivable how a very slow movement—a slow walk—and a rapid movement—running—are possible, while a medium movement, a tolerably rapid walk, for example, is impossible. In order to explain the inability to make medium movements when carrying a weight, Fieber adds that the external, artificial impediment unites with the regulative action of the brain-lobes. Their combined influence suffices so to counteract the abnormal inclination to rapid movements as to enable the patient to walk rapidly.

10.—*Paralysis Agitans and Kindred Conditions in Paralytic Tremor.* DR. ALBERT EULENBURG. (From his Hand-Book of Functional Nervous Diseases. Berlin, 1871. Psychiatrisches Centralblatt, March, 1871.)

The initial and principal symptom of paralysis agitans is the tremor, which exhibits now as a simple trembling, in the form of weak, oscillating, rapidly successive contractions, and now as violent clonic convulsions. These movements begin mostly in the upper extremities, and tend slowly to the lower extremities and to the muscles of the face. In the latter case the patient sometimes stutters. More rarely are the muscles of the body, especially those of the neck, implicated. In an occasional case, the tremor is circumscribed to one side of the body.

The trembling is independent of voluntary and passive movements. This fact may be turned to account in distinguishing this affection from various forms of chorea as well as from sclerosis of the nerve-trees.

The paralysis is accompanied by the tremor as a secondary symptom, and increases slowly; remains in most cases incomplete, and is not infrequently circumscribed. The extensor muscles of the hand are very frequently its seat. The electric reaction, as well for the induction as for the galvanic current, remains, in the affected muscles, unchanged. In exceptional cases only are the voluntary muscles, the muscles of the skeleton (Sketellmuskeln) excepted, implicated in the paralysis. The temperature, despite the continuous muscular action, is not increased.

Disturbances of sensibility show themselves now in the form of paralytic sensations—pricking, itching—now in the form of partial, usually incomplete anæsthesia. They may, however, be wholly wanting.

On the other hand, central symptoms are often present: headache, vertigo, sleeplessness, moroseness, hypochondria, melancholy, hallucinations, and maniacal attacks. If the affection be of long duration, not infrequently the memory and judgment are weakened.

Paralysis agitans is a rare affection. It appears rarely before the fortieth, and usually after the sixtieth year. Men are its victims more frequently than women. The author calls attention to the relationship (*Verwandschaft*) of this disease with certain toxic neuroses, especially with the tremor in chronic mercurialism, saturnism, and alcoholism.

Mercurial neurosis, tremor mercurialis, is very similar to paralysis agitans.

Tremor saturninus is much more rare, and usually does not extend to the entire muscular system. It shows a predilection for the upper extremities and certain muscles of the face—orbicularis and levator anguli oris.

Usually the above-named phenomena are preceded by other chronic symptoms of lead-poisoning, colic, paralysis of the extensors, arthralgia, etc.

In chronic alcoholism, trembling, as is well known, is one of the most frequent symptoms. But tremor potatorum, which may be complicated with muscular weakness and paralysis, is worse when the patient *à jeun*, especially in the morning; he is relieved by the usual dram or drams. Besides, the changes induced by chronic alcoholism may be pointed out in the other organs, particularly in the digestive.

The pathological anatomy of paralysis agitans has not made sufficient progress to enable us to fix the seat or to determine the nature of the inducing lesion. *Post-mortem* examinations have, thus far, yielded only negative results, especially so far as the nervous systems and centres are concerned.

To the few positive data belong those of Stoffela, Cohn, and Skoda.

Stoffela found atrophy of the brain with secondary hydrops in the ventricles and brain-membranes, and an apoplectic cyst as large as a pea in the right thalamus opticus; pons and medulla oblongata strongly indurated, the arteries at the base (of the brain?) calcified, and the lateral portion of the spinal cord, particularly in the lumbar region, traversed by gray opaque striæ, which, like the indurations in the pons and medulla, were composed of embryonic cellular tissue.

Cohn found marked atrophy of the brain in one case—a man forty-nine years old—and in another, atrophy of the spinal cord at the height of the second cervical vertebra.

Skoda discovered in a woman, aged thirty-four, an extended sclerosis of the brain (*Centraltheile*). In several opaque spots of the brain-substance the nerve-tissue had disappeared, and was replaced by embryonic cellular tissue, which, in like manner, had been produced by the sclerosis of the pons and medulla oblongata.

s, on the contrary, found only adipose degeneration of the pneumonic induration.

tein found in one case atrophy of the nerves, in another of the two pedunculi cerebri, and some points in the pons at e was a loss of substance; in a third his discoveries were

autopsies made by Th. Simon, in Hamburg, the result was re.

thor is of opinion that the extension of the affection, the s, and the few positive results obtained from autopsies, point and the upper portion of the medulla oblongata as the nt of the symptoms of paralysis agitans. As for the char- inducing lesion, it has been believed to be a sclerotic pro- centres—especially in the pons and in the medulla oblon- although there is much to justify this view, there is as much against it.

thor shows that the diffuse sclerosis of the nerve-centres dif- omatically, in very important points, from paralysis agitans, ts (darstellt) an affection *sui generis*. In cases of isolated the pons, which are rare, the symptoms differ materially of paralysis agitans, as is shown by the case described by his paper on the diseases of the pons. In this case there mor, but only a gradually-increasing weakness of the ex- ifficulty of articulation, strabismus, amaurosis of the left eye, ess, somnolence, and in the last weeks vomiting and severe temples. The autopsy showed a general sclerosis of the enlargement, particularly of the left half. Larcher mentions of sclerosis of the pons. Only once was there a general rays, however, increasing weakness without complete paraly- st cases, the mental dulness reached idiocy.

wa, therefore, that the appearance of the disease (Krank- hat exists in cases of isolated sclerosis of the pons is very om that of paralysis agitans, and it is further to be observed tter is met with only in persons, who have passed their ar, while the former is met with in young persons.

ing the differential diagnosis between paralysis agitans and lerosis of the nerve-centres, the author remarks: "In the lat- ng and gradually-progressive paralysis are also found. Here, cal disturbances, difficulty of articulation, contractions, and may appear."

rise of both may extend over several years. The prognosis unfavorable.

sclerosis, motor weakness, which progresses until it be- lysis, is the first symptom, while paralysis agitans is always y trembling. In multiple sclerosis the paralysis begins, ception, in the lower extremities, while in paralysis agitans the upper.

mbles in sclerosis is not spontaneous; it appears only in with passive or voluntary movements.

Finally, paralysis agitans must be distinguished from simple tremor which, though a more or less violent trembling, that sometimes affects all the voluntary muscles, the muscles of the face excepted, subsides when the patient is quiet, and increases when he is excited or exercises himself, without any paralytic phenomena or decrease in physical strength.

11.—*A Bullet remains in the Brain Nineteen and a Half Years without causing any Serious Trouble.* By Prof. FRANCESCO CORTESI (Atti del R. Istituto veneto, t. XV., Serie III., Dispensa IV., and Archivio italiano per le Malattie nervose, Marzo, 1871. *Psychiatrisches Centralblatt*, March, 1871.)

Joseph Soler, a lawyer in Venice, was shot in a duel, June 16, 1850. The ball entered the head above the right ear. Prof. Cortesi saw the wound five hours afterward.

The patient was bled, and cold was applied to the wound. On the 31st August he was deemed convalescent. For a considerable time his memory was weak, and vision was somewhat disturbed. In time, however, these two disturbances disappeared; his mind became as clear, and his judgment as good as ever.

He now complained of nothing but a painful sensation in the back and in the lower extremities, especially in the right, which became more acute when he coughed, sneezed, etc., and extended to the head. He died of pneumonia, December 7, 1869.

The autopsy displayed a funnel-shaped bone cicatrix above the right ear, and a notable thickening of the skull. On the petrous portion of the temporal bone, and on the border of the tentorium, a dark body was found, which consisted of two pieces of lead, separated from each other by a splinter of bone.

By raising the cerebellum, the finger could be thrust into a canal, which was in the brain-substance. At the end of this canal, which was ten centimetres in length, and ran horizontally, another rough body was found, which proved to be a piece of bone two centimetres in length.

THE proceedings of the "Vienna Society for Psychiatry and Forensic Psychology," at their regular monthly meeting, in July, 1870, we find fully reported in the *Psychiatrisches Centralblatt*, January, 1871, a new monthly journal, published by the Society.

Dr. Beer spoke of the new work of Dr. E. Boisseau, Professor of the military medical school at Paris, on feigned diseases, with special reference to the province (*Wirksamkeit*) of military surgeons in recruiting, discharges, etc., and of physicians connected with hospitals, prisons, benevolent institutions, and on the diagnostic aids for the discovery of simulation.

In the introduction, the author gives an historical glance of simulated diseases in order to show that, in the earliest ages, simulation was resorted to as a means to accomplish certain ends.

At the conclusion of this very interesting historical *exposit*, the author observes that, during the long wars of the French republic and

pire, in which the whole youth of France were called to try imaginable subterfuge was resorted to in the way of simulating to escape military service.

historical glance is followed by a review of the literature of diseases, from the time of Hippocrates to the present day. Now the lectures proper.

first lecture treats of simulated diseases in general. As for the second, the author, in a dissertation, published in *Les Annales*, 1869, divided simulated diseases into two principal classes, 1. Into such in which the simulant makes use of no means to produce disorder; and 2. Into such in which, on the contrary, he resorts to artificial means to produce some disease. In his dissertation, Boisseau avoids all rigorous classification, and considers it more practical to go through the various organs and systems in regular order to note the simulated affections of each. In the enumeration of individual affections simulated he gives the motive and the means which give rise to their rarity or frequency, the means used to detect, and finally, the means to discover the deception.

Boisseau reported several cases of nymphomaniacal excitability, for the most part, very acute in their course. Of nine cases of this form, three proved fatal in from five to eight days; in the other cases the excitable condition disappeared, more or less gradually, in the course of from ten to fourteen days. In these latter cases the unity of a persistent sexual character supervened, which, in some months, ended in exhaustion, accompanied by atrophy and degeneration of the brain.

In every instance, from the beginning of the disorder, in the acute cases, rapid death, and in the more protracted cases, until the eighth or tenth day, of the violent nervous excitement, together with persistent manic delirium, characteristic movements were observed which were the greatest sexual exaltation.

The patients showed every appearance of hyperæmia of the brain, the face was flushed, and the temperature of the head and cheeks was raised.

There was a continued spasmodic twitching of the muscles of the face, which caused the features to be greatly distorted; the eyes remained turned upward, for a considerable length of time; the mouth was sometimes thrust forward and sometimes retained in a contracted position, but was always in motion; the muscles of the mouth were never at rest. The lips were now in a kissing, now in a protruded position, and were often covered with froth, while a disposition to vomit was often manifested. The upper extremities were in constant motion, and generally showed an inclination to increase the excitement by masturbation.

The lower extremities were sometimes extended, sometimes bent and raised, and with the aid of the pelvic muscles produced a strong, up-and-down movement, when urine and excrement were expelled.

The paroxysms lasted from five to ten minutes, and were followed by exhaustion, resembling sopor. In the more acute cases the interval between the paroxysms was very short. The circulation

at these times was greatly accelerated, the action of the heart was violent, the pulse increased to 140 or 150, and this increase was the most certain sign of an unfavorable prognosis.

Most of these cases were attended by œdema of the skin of the head; which, in the milder cases, disappeared.

In all the cases, the hyperæmia was localized, more especially on the inner surface of the hemispheres, although it extended considerably beyond their convexity.

In two cases thrombosis, and in one case phlebitis of the sinus facialis, in the posterior segment, where it crosses the sinus transversus, were present.

Dr. Maresch compares this localization of the anatomico-pathological changes with those that occur in epileptics, especially when their etiology points to a sexual basis, and sexual excitement is observed in the progress of the disease, and calls attention to the observations in epileptic cases in which no changes in the convolutions have been observed.

In relation to the treatment, Dr. Maresch stated that digitalis was given, in accordance with the recommendation of Prof. Albers, of Bonn, in large doses, but the result was not encouraging. The action of the heart became irregular, and the cases all terminated fatally.

Later, on the supposition that a progressive paralysis of the vagus and the vasomotor nerves was the cause of the increased circulation, quinia was given, twelve to twenty grains daily, in solution, and cold was applied with better results.

Dr. Benedikt made some remarks on the electro-therapeutic treatment of insanity.

Among the reasons that induced him to make the experiments of which he spoke, he mentioned first the great influence which electricity has in congestions in the central nervous system, that tend ultimately to lead to sclerosis, and particularly in that form which is characterized as diffuse sclerosis of the central nervous system.

As the psychical symptoms often have the same anatomical causes, we can, *a priori*, anticipate a favorable result from the use of the galvanic current.

Further, in consequence of isolated foci of disease, as well as through secondary irritation of the vessels, psychical symptoms may originate in the base of the brain and in the cerebellum, as, for instance, neuro-retinitis, dizziness, etc.; and if it be possible to produce a beneficial influence on the latter conditions by the galvanic current, especially by treating the sympathetic or the head direct, it is *a priori* to be presumed that we can obtain a favorable influence on the former.

A third is, further, the well-known resolvent power of the galvanic current from which in diseases, such as hydrocephalus chronicus, pachymeningitis hæmorrhagica, a good result may be anticipated. Another fact to be considered is the abnormal increase of the reflex relation between the sensitive skin and muscle fibres and the vasomotor nerves in diseases of the brain.

The speaker called attention to Rech's recent communications concerning the relation of the vasomotor reflex nerves to psychosis. Here

belongs also the fact communicated by Arndt, that peripheric, electric irritation produces changes in the pupil. The fact should also be mentioned here, which the speaker had frequently observed, that, for example, by irritating a lower extremity, changes at a distance, and frequency of the radial pulse of the opposite side, occur. The case of depression, a form of mental disorder mentioned by Arndt and others, by extended skin and muscle irritation, must be attributed to this reflex irritation through the vasomotor nerves. The latter method is applicable in cases of mental depression only, but electric treatment is not contraindicated by psychical irritation; but then the galvanization of the sympathetic through the head should be undertaken. The last is very important, and has been adopted with good results by Remak in secondary psychosis in isolated foci of disease in the brain. The proceeding should be similar in cases of congestion of the brain.

At the regular meeting of the Society in October, 1870, Dr. Witla-cil spoke of the defects in the Austrian treatment of criminals affected with a disease of the mind.

He showed that the decisions of the Austrian criminal courts are in glaring variance with the teachings of modern psychiatric science, and that, furthermore, the course pursued by the courts since 1853 tends to result in the condemnation of those affected with a disease of the mind, inasmuch as the initiative examination of the accused is entirely within the jurisdiction of the court. It is especially to the clauses "completely robbed of reason," and "or in periodic insanity," which, in the administration of justice, have led to the recognition of partial responsibility, and of which the court makes itself the judge. If the accused thinks logically, because his thinking-mechanism is not yet disturbed, he is declared of sound mind, and still his consciousness may be already disturbed, and a disease of the mind may exist. Not less dangerous is it for the court to judge of the acts of the accused in his lucid moments, as it is difficult, even in congestive conditions, to define the limit in pathological changes in the brain, and yet these changes must be considered as the starting-point. To decide what should be attributed to the diseased mind, and what not, is simply impossible. Let them, in like manner, recognize certain gradations of intoxication, which admit of responsibility, while, however, intoxication as acute alcoholism in all its gradations influences the action of the brain, and undertake to decide the question of responsibility from the subsequent statements of the accused, who often has no recollection of what has transpired, and from the statements of witnesses with regard to his condition and the state of his consciousness. The judges place too great confidence in their own judgment, and frequently do not take the trouble to consult experts, whose opinions, furthermore, they oftentimes mistrust. The fault lies, in part, in our faulty psychiatric teaching. The physician does not always take a strictly scientific stand; the consequence is, that the judge is inclined to think his own opinion of equal value.

The speaker, in defence of the ground he had taken, cited three cases that had come under his notice. The first was a young man, aged twenty, who had already been repeatedly punished for petty

thefts, although the attention of the authorities had been called to the fact of his being decidedly idiotic. The judge was of opinion that the accused was, indeed, weak-minded, but not to such a degree as to be irresponsible; he sought no medical advice, and passed sentence.

A second case, a clerk, soon after leaving the hospital, where he had been for a disease of the head, was arrested for burglary. His reticence was deemed very ominous. Within a week he became very violent; advice was taken, and he was sent to the hospital for criminals as insane, and from there he was transferred to the insane asylum, where he was found to be incurable.

Third case, a boy of eleven years, who had been orphaned at an early age, and was bound out. Harsh treatment led to his killing four canaries belonging to his mistress, and a quarrel with another bound boy determined him to set his comrade's bed on fire in order that he might be punished. The judge was convinced that the boy was afflicted with pyromania and epilepsy; without consulting a physician, he nevertheless sent him to the house of correction, where he remained a year, when he was discharged on account of epilepsy. He is now at his former home. The attacks are frequent, and his mental faculties are evidently seriously impaired.

The doctor comes to the conclusion, from these and many other cases, that the Austrian laws do not afford sufficient protection for the insane. Insanity, he insists, absolutely precludes responsibility, and that always, where there is any reason to question the perfect sanity of the accused, an expert should be consulted, and the judge, in all such cases, should be compelled to be governed more or less by his opinion.

At a meeting of the Society in November, 1870, Dr. Beer read a paper on the history of pyromania.

I. Ernst Platner. He proposed to speak of the history of an hypothesis, which for many years blinded the administrators of justice. It had been defended on physiological and pathological grounds with great apparent acumen. It was the hypothesis, namely, which Henke (*Kopp's Jahrbuch*, vol. x., p. 118) in 1817 hazarded, that at the pubescent period there is a tendency to a specific pyromania. Before he proceeded with this historic sketch, he would correct an impression that was almost universally entertained: that it was Platner who first called attention to this mania. Henke was the first to smuggle in this historic error. In his first paper on this subject, he says: "In the cases reported by Platner, as the above extracts show, the faculty clearly asserted that, during the period of development, there is a morbid tendency to pyromania."

Thus, all succeeding writers have misused Platner's authority, and ascribed to him an hypothesis, which he or the faculty, whose representative he was, had no intention of presupposing. So, for example, Dr. Sandsberg says: "We cannot consider it one of the least of the gifted Platner's services, that he called attention to the existence of such a mental alienation, if we reflect how many have been saved by this discovery from death on a funeral-pile, in a conflagration."

Dr. Beer wondered how it was possible to ascribe such an error to the great Platner, by those who studied the cases described in his "*Quæstiones Medicæ*" (Lips., 1824, Ed. Choulant).

Dr. Obersteiner, Jr., followed, and communicated the following facts:

"The examination of the brain of paralytic insane, who died in various stages of disease, showed that there is a period in which, in consequence of chronic hyperæmia of the brain and of the consequent lateral pressure in the vessels, an abundant exudatory deposit takes place in the perivascular lymph-spaces on the one side, and a remarkable exudation of white blood-corpuscles on the other. From the perivascular lymph-channels these vital organisms can penetrate even the substance of the brain, and here, finally, partly in the white and partly in the gray substance, reach a higher organization by sending out appendages, and thus form themselves into cellular tissue. This characterizes a later stage of the disease. The microscope discovers atrophy and sclerosis of the brain when the disease is so far advanced."

At the meeting of the Society in January, 1871, Dr. Flechner continued his remarks, begun at a former meeting, on pyromania.

He considered the subject in its medico-judicial aspects, and reported eleven cases of arson that had come under his observation. Ten of the perpetrators were declared insane, and one in his right mind.

After going through the literature of the subject, Dr. Flechner expressed the opinion of Idler, who considers pyromania an abstraction, which the judicial physician has no need, and the views of Caspar, Riesinger, Jessen, and Lion, who are of opinion that arson, when committed by insane persons, may be explained as we explain any of their other acts. Dr. Flechner has come to this conclusion, not only from an unbiassed reading of the believers in pyromania, but also from studying the cases that have come under his observation during his thirteen years' experience as judicial physician. He insists that there has never been a case under his notice that seemed to justify the recognition of a form of insanity that could consistently be characterized as pyromania.

Of the eleven cases Dr. Flechner had observed, seven were males and four females.

Eight were between fifteen and twenty-five, and three were more than thirty years of age.

Eight were peasants, one was a wagon-maker, one a baker, and one clerk.

CASE I.—A young man, who was pursued by the idea that he could induce his father to comply with an absurd demand by burning the house down.

CASE II.—Hallucinations were present which led to arson as a means of getting money.

CASE III.—An act of revenge for an imagined wrong.

CASE IV.—Originally weak-minded; in consequence of intemperance in drinking, insane.

CASE V.—An act of revenge and maliciousness; the perpetrator weak-minded, and not conscious that the deed was punishable.

CASE VI.—An idiot was hired to set fire to a house for a few centners.

CASE VII.—An idiot was persuaded, by a malicious woman, to burn a house.

CASE VIII.—Arson as a consequence of hatred and revenge. ~~petrator~~ was idiotic and insane.

CASE IX.—A sane but demoralized person. Committed arson ~~6~~ times from malice.

CASE X.—Melancholy, with a feeling of anxiety, tired of life, ~~an~~ increase of these conditions at the period of menstruation; attempt a suicide and arson in consequence of an impulse to do something to get rid of the feeling of anxiety, and to change her place of service.

CASE XI.—That of an idiot, wholly incapable of distinguishing between right and wrong.

Dr. Beer continued his contribution to the history of pyromania.

He showed that it was really Oslander who was the first to assert that there is any connection between the sexual development and a desire to destroy by fire. He makes this statement in his treatise on Suicide (Hanover, 1813), and in his work on the Diseases of Puberty in the Female (Tübingen, 1816, 2d edition, 1820). And, as Prof. Beer had already shown that Platner was innocent of the authorship of the pyromanian hypothesis, so he showed now that it should really be considered as having originated with Oslander.

Dr. Beer now discussed the opinions of Henke.

The first paper in which Henke speaks of pyromania may be found in Kopp's *Jahrbüchern der Staatsarzneikunde*, 1817. It is entitled "Ueber Geisteszerrüttung und Hang zur Brandstiftung als Wirkung unregelmässiger Entweckelung bei Eintritte der Mannbarkeit."

Henke endeavors to point out the diagnostic signs of the disease of the nervous system at this period—puberty. He adds that the judging of the psychical diseases of this period is rendered difficult by one circumstance, which otherwise can be considered a sign of the disease of puberty (*Entwicklungskrankheit*), namely, by its rapid and unexpected appearance and sudden disappearance. The psychical disturbances under consideration may pass through all the various forms and gradations of melancholy, insanity, and madness.

The youthful incendiaries are often, in the opinion of Henke, the victims of an uncontrollable impulse caused by the physical development they are undergoing. If the courts and physicians fail to recognize the fact, says Henke, that this pyromania may be due to a physical disease, the unfortunate incendiary may be punished as a criminal, while he should not, in justice, be considered a responsible agent.

At a meeting of the Society in February, 1871, Dr. Meynert communicated some clinical cases:

The first, a case of insanity complicated with morbus Basedowii, the patient being a girl of seventeen years. There was a psychopathic predisposition in her family. The direct cause was mental agitation in consequence of the death of her mother. She soon afterward began to show signs of mental derangement, became restless, complained of hallucinations of vision, ran away from home repeatedly, and became greatly demoralized. At the same time, struma, palpitation—120 to 150 pulsations—frequent epistaxis, increased temperature of the head, and a medium exophthalmos, without disturbance of movements of the eye or interfering with the closing of the lids.

This case shows in a noteworthy manner just such psychical disturbances as accompany hyperæmia of the brain, and is a voucher for the great importance of disturbances of the circulation in the insane.

The doctor described other cases of differential diagnostic importance with reference to paralytic insanity.

The incomparably greater number of paralytic insane, in which the disturbances of intelligence appear before or with the paralysis, are due to the atrophy of the anterior and middle lobes of the brain. In those cases in which the paralysis precedes, for any considerable length of time, the disturbances of the intelligence, and the latter in their advent also follow another order than in paralytic insanity, in the above sense, pathological changes in the spinal cord (Rückenmarksprocesse), gray degeneration of the posterior columns, are the cause. In these cases there is no typical atrophy of the brain, but sclerosis. This is the result of hyperæmia, the seat of which is the brain, as soon as the degeneration of the spinal cord reaches the planes which are traversed by the nerves of the arteries of the head. This occurs later, because the degeneration of the spinal cord proceeds from the lumbar marrow. The course of the final psychopathic stage is consequently much shorter—it lasts only a few weeks—than is that of typical paralytic insanity.

From this second series of unusual cases, in which a nexus also certainly exists between the psychosis and the paralysis, we must, further, distinguish diagnostically those cases of insanity with paralysis, in which no other connection exists between the two than that an imperfectly-nourished brain is more susceptible to psychopathic disturbances. Hence it follows that all nervous diseases have a certain general character; the appearance, however, of any special disease of the brain, and of a psychosis in conjunction with them, must be considered accidental.

The psychiatric clinic of Dr. Meynert contains two interesting cases of this kind. The first is that of a man forty-four years old, a hard drinker, who is said to suffer from periodic madness, but who has always been calm in the hospital. For four years he has suffered from progressive amblyopia, caused by bluish atrophy of the optic nerves, with incipient paralysis of the left side, which was subsequently cured, and was followed by paralysis of the right side, more particularly of the upper extremities, together with a black tongue and paralysis of the left oculomotorius. The paralytic disturbances have not increased for some time. They began with vertigo and pain in the head—both long since disappeared. Here is an affection of the left peduncle of the brain on a line with the roots of the oculomotorius. This affection is clearly not a tumor; its development was not progressive, and its first stage was marked by violent symptoms.

The second case was that of a man thirty-eight years old, who had lost his place in a business-house on account of a progressive difficulty of enunciation. He became very melancholy, imagined himself pursued, and made several attempts at suicide. At the hospital his melancholy and hallucinations disappeared. Some years ago, he suffered from obstinate syphilitic affections. At present he is afflicted with a

severe progressive paralysis of some of the nerves of the head; the muscles of the left eye are paralyzed, there are enlargement of the pupil and contraction of the orbicularis palpebrarum, different groups of both sides of the face are paralyzed; the tongue turns to the right, the uvula to the left, and the left arch of the soft palate stands higher than the right and moves more promptly. The patient swallows with difficulty, in consequence of which his food is often thrown out at the nose.

Dr. Leidesdorf observed that he, too, had seen several cases of *tabes*, which for years had shown no psychical disturbances, and in which finally, in consequence of disturbances of coördination, psychical manifestations suddenly appeared, bearing the character of a paralytic mental disorder.

With regard to isolated foci of disease, which also, in course of time, are complicated with mental disturbances, Dr. Leidesdorf communicated a case of melancholy in the form of *hypochondriasis*. The patient had been syphilitic, at which time his treatment was, for some reason, interrupted. He showed indications of a paralysis of the oculomotorius, with paralysis of the hypoglossus and facialis. After a preparatory antisyphilitic course of treatment, the paralytic symptoms disappeared, and only a feeling of anxiety remained, which, however, was ascribed in great measure to the patient's sensitive nature. Subsequently the same patient had an apoplectic attack complicated with convulsions. He returned to the hospital, when he ended all by a pistol-shot.

Dr. Beer communicated a similar case. A thorough antisyphilitic course of treatment effected a complete cure.

Dr. Jaffe observed that it had often been asserted that excessive coition produced *tabes*. The cases of *tabes* that had come under his notice were traceable, he thought, to colds. He had known only one case that was apparently preceded by excessive venery, and in this he was not certain that was the cause.

*On the Routine Use of the Ophthalmoscope in Cases of Cerebral Disease.*¹ By J. HUGHLINGS-JACKSON, M. D., F. R. C. P., Physician to the Hospital for the Epileptic and Paralyzed, and Physician to the London Hospital.

About three years ago I wrote in this JOURNAL ("Latency of Optic Neuritis in Cerebral Disease," February 8, 1868), to urge strongly, as I did six years ago ("Royal Lond. Ophth. Hosp. Reports," vol. iv., 1865), the routine use of the ophthalmoscope in investigations of cases of disease of the nervous system—stating, as one reason, the fact that *very striking ophthalmoscopical changes may exist when the patient*

¹ When urging on physicians the routine use of the ophthalmoscope, I may properly mention that, to the best of my belief, Dr. John W. Ogle was the first physician in this country to write on Medical Ophthalmoscopy. The papers by Dr. Clifford Allbutt, in this journal (1868), will be familiar to physicians. These papers show convincingly the great value of the comparatively new instrument of research in the investigation of medical cases.

believes that his sight is good, and when he can read the smallest type. I wish once more to urge this point, because I still find the assertion above made is received with great incredulity by some physicians, and because, since writing the paper referred to, I have had numerous illustrations of the fact stated. I gather from the quotation below given from Graefe, that Blessig was the first to draw attention to it.

At first glance, it does seem sheer nonsense to speak of severe changes in the optic nerves of patients who can read the smallest type,¹ and who have no complaint to make of their sight. I do most willingly grant that the incredulity of those who do not use the ophthalmoscope is quite intelligible; but the fact is not denied by ophthalmic surgeons.

From a scientific point of view the necessity of not overlooking a decided pathological condition is obvious. Then it is of some importance in a case of severe cerebral disease to be able to tell the patient's friends that sight, probably, will fail; for this prediction when verified will satisfy them that we have not misunderstood the nature of the case in its early stage.

There are few cases on which such different opinions are given as those of cerebral tumor and other kinds of "coarse disease."² They often begin by symptoms which are not specially nervous, although really dependent on brain-disease. The early symptoms are often put down to stomach-derangement, to overwork, or to some other minor cause. The patient is naturally very anxious to put forward the view that his severe headache, vomiting, etc., are owing only to some temporary derangement, and mostly accuses the liver. He may urge that his illness began by "attacks of bile." I have known the friends of a patient lament bitterly the different opinions that have been given at the early and late stages of a case of cerebral tumor. Every practitioner will know of cases of young men who have first severe headache, and, perhaps, urgent vomiting, and scarcely other symptoms, and who occasionally for weeks, or even for months, remain able to do their work somehow, especially if, as occasionally happens, the severe pain in the head only comes on in the night. The absence of renal disease being ascertained, the symptoms are strong evidence of the existence of "coarse" disease inside the head. We often see patients blind from optic neuritis, especially in children who are reported to have had "bilious fever." It is frequently the "fever" that attends coarse disease of the brain. I feel sure that the use of the ophthalmoscope would sometimes save us from the mistake of declaring the

¹ The reader will observe that I do not use expressions implying that sight is quite unaffected when there is optic neuritis. It is not necessary for me to prove that. To ordinary tests sight is often good, and, therefore, without routine ophthalmoscopic examinations, we may overlook a striking pathological condition. The obvious explanation is that the inflammatory process affects the nerve-fibres of the nerve-bundle secondarily, and that, so long as sight is conserved, they have not suffered, or have suffered very little.

² I use the term "coarse disease" to include not only tumors, ordinarily so called, but all kinds of adventitious products—syphilitic nodules, abscess, blood-clot, hydatid. Any one of these foreign bodies may lead to optic neuritis as it may to local encephalitis, on which convulsions, etc., depend.

symptoms of a case to be of non-cerebral origin, because superficially considered they seem to refer to other organs than the brain. In all such cases the ophthalmoscope should be used, *whether the patient complains of defect of sight or not, and when he can read the smallest type*. Although the absence of optic neuritis would not negative the existence of coarse disease within the cranium, the presence of the neuritis (double) would, I think, render the existence of this kind of change *almost* certain in many cases of very severe headache without renal disease; we cannot be quite certain. I had about a year ago a patient under my care, the whole course of whose symptoms—and double optic neuritis was discovered—seemed to point to coarse disease of the brain; but there was no such change found *post mortem*; the brain was very much wasted. Nevertheless, I repeat, double optic neuritis occurring along with intense headache, and especially with vomiting (perhaps bilious), is *almost certain* evidence of the existence of coarse disease of some kind—not of any particular kind—within the cranium.

In cases of loss of speech (aphasia) there may occasionally be discovered marked optic neuritis, when there is nothing in the patient's bearing to suggest that his sight is defective.

In children it is absolutely necessary to use the ophthalmoscope when they suffer from severe cerebral disease. We occasionally discover optic neuritis in a child whose parents "have never noticed any thing the matter with his eyes."

In cases of acute cerebral disease the patient may be too ill to take any notice of our attempts to test his sight. Here, again, we must use the ophthalmoscope.

I do not say that we can with certainty predict that sight will fail when we have discovered optic neuritis. It does fail in most cases. I have had, however, under my care a woman twenty-five years of age, who had severe optic neuritis in 1867, and whose sight a year later had kept good, so far as she knew, and so far, also, as the test of reading showed, but I have no note of the extent of her field of vision. She could read "Brilliant" type rapidly. The ophthalmoscopical signs, at first very extreme, altered remarkably, so that when I saw her last the abnormal appearances in the fundus were so slight that I dare say many, seeing her then for the first time, would have been incredulous that she had ever had severe optic neuritis at all. Yet she certainly had had it. Her eyes were examined in the early stage, not by myself only, but by Brudenell Carter, by Soelberg Wells, and by Clifford Allbutt, of Leeds.

This woman is one of two patients under my care, of whom Mr. Soelberg Wells speaks, when writing on conservation of sight with optic neuritis, in his "Treatise on the Diseases of the Eye" (pp. 399 second edition). He mentions, also, a case, from his own practice, of unocular neuritis, in which the acuity of vision remained perfectly normal throughout. I quote the following from his work: "Mauthner ('Lehrbuch der Ophthalmoscopie,' pp. 293) narrates an interesting case in which a patient affected with optic neuritis retained a normal acuteness of vision *up to the time of his death* (which was sudden).

believes that his sight is good, and when he can read the smallest type. I wish once more to urge this point, because I still find the assertion above made is received with great incredulity by some physicians, and because, since writing the paper referred to, I have had numerous illustrations of the fact stated. I gather from the quotation below given from Graefe, that Blessig was the first to draw attention to it.

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From a scientific point of view the necessity of not overlooking a decided pathological condition is obvious. Then it is of some importance in a case of severe cerebral disease to be able to tell the patient's friends that sight, probably, will fail; for this prediction when verified will satisfy them that we have not misunderstood the nature of the case in its early stage.

There are few cases on which such different opinions are given as in the case of cerebral tumor and other kinds of "coarse disease."² They often begin by symptoms which are not specially nervous, although usually dependent on brain-disease. The early symptoms are often put down to stomach-derangement, to overwork, or to some other minor cause. The patient is naturally very anxious to put forward the view that his severe headache, vomiting, etc., are owing only to some temporary derangement, and mostly accuses the liver. He may urge that his illness began by "attacks of bile." I have known the friends of a patient lament bitterly the different opinions that have been given at the early and late stages of a case of cerebral tumor. Every practitioner will know of cases of young men who have first severe headache, and, perhaps, urgent vomiting, and scarcely other symptoms, and who occasionally for weeks, or even for months, remain able to do their work somehow, especially if, as occasionally happens, the severe pain in the head only comes on in the night. The absence of renal disease being ascertained, the symptoms are strong evidence of the existence of "coarse" disease inside the head. We often see patients freed from optic neuritis, especially in children who are reported to have had "bilious fever." It is frequently the "fever" that attends coarse disease of the brain. I feel sure that the use of the ophthalmoscope would sometimes save us from the mistake of declaring the

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not of those who have used the ophthalmoscope much, but of those who have used it little. It requires much practice to give true clinical value to "congestion of the optic nerves" or to "congested retina;" to slight changes about the edge of the disk or to alterations in the course and calibre of the veins. In the paper referred to, I spoke on this matter, and from it I quote the following: "I have never laid stress on slight alterations in the color of the disks, or on slight abnormalities in the size or course of the large retinal vessels. . . . We may get as far wrong by attaching too much importance to slight appearances as by altogether overlooking decided pathological changes." I certainly did not speak too strongly.

Prof. Liebreich, at visits to the Hospital for the Epileptic and Paralyzed, has frequently pointed out striking peculiarities in the fundus, which he declares to be really physiological variations. Speaking of the importance of ophthalmoscopic examinations of many normal eyes, Prof. Liebreich remarked at the Clinical Society (see *Lancet*, November 5, 1870): "En effet, l'aspect du fond présente à l'état normal, on pourrait dire autant de variations que la figure humaine, et il faut l'étudier indéfiniment si on ne veut pas être exposé à prendre quelquefois pour une altération pathologique ce qui n'est qu'une modification individuelle d'un œil sain." Obviously, then, while the student may observe any case he likes as minutely as he can do with precision, he should not dare to draw conclusions from very slight intra-ocular appearances.—*Medical Times and Gazette*, June 3, 1871.

II.

MEDICAL JURISPRUDENCE.

Report of the Commission appointed to determine the Mental Condition of EDWARD H. RULOFF, under Sentence of Death (since hanged) for Murder.

THE following report of the commissioners appointed by the Governor to examine Edward H. Ruloff, and to ascertain whether or not he was insane, will doubtless prove of interest to the readers of the *PSYCHOLOGICAL JOURNAL*. Comment upon the character of the examination would be superfluous, but it may safely be asserted that a more decided *non sequitur* than the conclusion arrived at by the commission was probably never enunciated by a similar body:

To his Excellency John T. Hoffman.

DEAR SIR: In accordance with the request of your Excellency, we proceeded to Binghamton on the 9th day of May, and on the 10th of May made a careful and thorough examination of Edward H. Ruloff, Mr. Dwight King, of Albany, accompanying us and acting as secretary. Herewith we have the honor to present our report and conclusions.

Very respectfully your obedient servants,

(Signed)

JOHN P. GRAY,

S. OAKLEY VANDERPOOL.

Upon our entrance into the cell of Ruloff, the prisoner was sitting upon a cot-bed, surrounded by books, and apparently intent upon study.

a white shirt and light pants, and presented no appearance of anxiety. He had not been previously informed of our arrival, upon our announcement by the sheriff, he indicated no surprise or trouble, but rose, and, with some appearance of embarrassment, received us. Immediately upon understanding the object of our mission, Ruloff said: "Gentlemen, this is no work of mine. I intend to be either insane or an idiot. I am feeble in body, but I see, but this has not affected my mind. The proposal of a move is no move of mine."

After a little preliminary conversation, he was informed that the purpose was not to order the examination, and that it was no idle curiosity about the commission there, but simply a duty; that they desired a thorough examination; and, first, of his physical condition. To this he gave ready assent, and said he did not desire to deceive.

He is a man about five feet eight inches in height; head large with the facial line almost perpendicular; under jaw square; mouth rather large, with closely-compressed lips; nose dark gray, with large pupil, and steady; the whole expression concentrated, showing great self-control and power of attention. Shoulders broad, chest full, in fact a compact, vigorous frame, and well-shaped arms. His complexion is healthy, although showing confinement; skin soft and perspirable; temperature of muscles soft from disuse, but full; tongue clean; pulse, taken with a sphygmograph, 90 per minute, the sphygmographic trace an entirely sound condition of the heart. No examination with a ophthalmoscope: He wrote and read, however, without special aid, only having a single lamp in his cell; as there was no dimness of vision probably came from age. When the pupil was dilated by a light applied directly to the eye, the dilatation and contraction were rapid, and demonstrated that the largeness of the pupil was natural, and not due simply to confinement in a dark room. He had no particular food; could eat any thing; digested well; slept well, and the body was well nourished. He complained for many years he had a lack of unctuousness of skin, and was covered with fat, and that he found he could not cloy his system by eating fat. This had existed since 1850.

In answer to questions, he said that he would prefer not to be where he was born, but it was in the North; his parents were in good vigorous health; his father died when he was five years old, and his uncle took care of him. He went to school and got through high-schools, studying all the English branches, before he was twenty, his uncle declining to have him study the classics unless he would have him enter a profession. His own desire was to be a lawyer, and be a gentleman. He wished to lay a broad foundation for a general education. He entered a lawyer's office as clerk, with the purpose of earning a living, and at the same time have opportunity to pursue his studies; took up chemistry and botany, Greek and Latin, and remained two years there, devoting all of his leisure to study, and saving even the time it took him to eat his meals. He

then entered a store as clerk, where he continued the same study, keeping his books open on the desk, and taking every leisure moment for study. Afterward he commenced the study of medicine, with the intention of becoming a physician, but also continued his study of languages. At about this time he married, and at twenty-five years of age his career was interfered with by what he denominated a difficulty that sent him to Auburn Prison. He spoke of having been broken down in health while there, from which condition he had never rallied.

Question. How long since your constitution was thus broken down?

Answer. I don't say that my constitution was broken down. My health was feeble. I cannot run three times across this room (about thirty feet) without feeling it greatly.

Q. How long has this condition existed?

A. About fifteen or twenty years, and particularly since 1853.

Q. How old are you now?

A. Fifty years; and since I was thirty-five this inability to endure fatigue has existed.

Q. When you went to prison in 1846 what was your condition of health?

A. Vigorous and strong. I weighed from one hundred and seventy to one hundred and seventy-five pounds. While there I ran down to one hundred and eight pounds. I had what I called acclimating fever. I was taken sick after seven years' imprisonment. That was the particular sickness causing my present weakness.

Q. What was the cause of that illness?

A. I cannot tell; I only know that I could neither eat nor drink; could do nothing; was out of body and mind; my whole system was deranged; my flesh wasted away; I had night-sweats; was restless and could not sleep; I could not attribute all this to any individual cause.

Q. During the whole time you were in prison were you engaged in the study of philosophy?

A. I occupied all my leisure in languages more or less, and at that time I had been thinking about it day and night, because I believed I had the secret of success in philological studies. I was appointed cook in the hospital for twenty or twenty-five persons. I was then so sick that I could not stand up and do the work, but had to sit with my elbows on the table to handle the things in cooking, and after washing the dishes I had to lay on the floor on my back, and wipe them while resting my elbows on the pavement. I was bound to live, if possible, and to stay in this kitchen seemed my last chance. I wanted to complete my book; that was the only reason that I cared to live. From this time I never recovered my tone of health. One night, when sick and feverish, having eaten nothing through the day, I got up, cooked a pig's cheek and ate it all, went to bed, and woke up in the morning as well as usual. I never had any sickness before 1853.

Q. How long have you entertained the idea of this formation and derivation of language that you call your system?

A. For over thirty years I have been impressed with the fact that there was something in language that I was to discover.

Q. How early do you date this?

A. From the time I was fourteen to sixteen years old, when I was interested in the study of language.

Q. At what time in that study did this idea arise definitely?

A. When I commenced the study of the Greek Testament. I now ad new beauties in the Greek language, and perfection and method, ch satisfied me that it was the result of an older civilization.

Q. Have you given attention to the study of other languages than xk and Latin?

A. Oh, yes! French and German; in fact, I can read all the Euro- n languages except the Slavonic. In the study of Portuguese I nd most difficulty; but, after all, the Greek and Latin languages, ecially the Greek, were built up with the utmost art. They were fected by men who could command means and time, and who had skill and industry to study and perfect the philosophy of their lau- ge.

Here Ruloff brought his manuscript, and took a number of words illustrating the system and skill with which the Greek language had n constructed, and the Latin and English derived therefrom. He k, among other words, the words *carotid*, *lungs*, *brain*, and traced manner in which they were derived from the original Sanscrit ts. He maintained that all the fictions of Greek and Roman my- logy covered some great philological truths. He took the fable of seus and Medusa, and believed that from the word *Perseus*, which, ig divided, contained the roots of the words for *serpent* and *reptile*, text of the story was foreshadowed, and was contained in the re itself, and so of all fables, the names under which they were wn were monogrammatic, and afforded a key to the story to which y gave name.

Q. Was the original alphabet of the Greek language, in your view, ned from arbitrary signs, and the language thus built up, or was it ived from some other language and subsequently perfected?

A. Hardly arbitrary, because that would preclude choice. There method in its formation; each letter was indicative.

Q. Do you mean that the Greek is an original language? If not, n what was it derived?

A. The phraseology of Homer is worked up wonderfully, and is atly enriched from that of the early Greek writers. The letter "R" s not found in the earlier Greek. In writings up to that time that er was not necessary, but when Bacchus came out of Malia, and echanalian life with its orgies, revelry, and carnivals began, it then ame necessary to use hitherto unknown letters to properly desig- e the words necessary to describe the new conditions of life. Cer- n forms of language admit of perfection. The phraseology of Homer is perfect and as fresh now as when written, and will be for all time. t, I do not believe that such a person as Homer ever lived. He s the centre of a system which was perfected under that name. I iere, with others, that no one man was the author of all that is as- bed to Homer.

Q. Some say the same of Shakespeare—that he was not the origi- or of all that he wrote?

A. I don't think that does Shakespeare justice; his adaptat~~ions~~ were really originations.

Q. Did you originally select the Greek language from which to develop your system?

A. No; I was gradually led up to that. My first purpose was ~~va~~g as it must be in the case of all young men.

Q. Are there natural tastes for language, or do those tastes ~~co~~me from association and cultivation?

A. I do not say that I had any original taste for language; it came entirely from cultivation. I was thrown among persons who brought the study of language to my attention.

Q. Did you early have a professorship of language in view as an ultimate aim?

A. I had a scholarship in view, and some situation—probably a professorship.

Q. What advantage do you propose to the world from the development and perfecting of your system?

A. It makes the study of language more of a mental discipline, while at the same time it would simplify the study. It would teach scholars to think at every step, and thinking is mental discipline. Unless a child understands the intrinsic meaning of a word, what good can its study do him?

Ruloff here gave a number of illustrations of his system. He said that the analysis of the names of animals proved that the name itself was derived from the habits, construction, or the sound made by the animal. Their language was methodical. He then stated that his earnest wish was that the Governor might fully appreciate this new philological system, and that his book might be placed in proper hands to be developed and published. He said that he did not care what became of himself.

Q. Did you adopt self-culture from a desire to thus educate yourself, or from the necessity of the case?

A. Entirely from necessity. I should have gone to a university had I had the opportunity. My father was dead; I was alone in the world; I wanted to be a gentleman; and what could I do? Intelligence was a prime necessity to this.

Q. Did you make every thing else subordinate to education?

A. I can't say that.

Q. Did you make all of your studies subordinate to philology?

A. No; I made that the chief study, without giving up every thing else; I turned my chief attention to philology.

Q. When did you form the purpose of making this philological system a special study?

A. I only fully formed it when I knew that I should surely succeed in it.

Q. Did you study medicine with the intention of being a physician?

A. I did, and after two or three years got into trouble and abandoned it.

Q. Have you ever studied telegraphic signs or language?

A. I have not, either practically or theoretically.

Q. To what church did your father go?

A. Episcopalian. I took no special interest in the church. I went as a habit and an intellectual pleasure. I never claimed to be a saint; never tried to make myself an example. One of my first ideas was to furnish the etymology of every word in the Greek Testament. I studied it only for its language. Sometimes I believed the Testament to be true, and a revelation, and sometimes not.

Q. Are words derived from the necessities of man's condition? If so, how do you account for the introduction of the word "immortality?"

A. That word has not escaped my attention. Its etymology shows it means both life and death.

Q. What do you understand by the word "God?"

A. The ever-living, not subject to death. At times I have believed in the evidence of such a being as one ever-living, and at other times I early drew certain lines. On the one side was the knowable; on the other the unknowable. This was before I was twenty, and then I came up my mind that I could believe nothing that I could not demonstrate.

Q. What do you understand by religion?

A. The acceptance of God as the author of all things; His worship being infinitely good; the acceptance of what is called Christianity. I don't say that I believe it. I never had any hobby about faith. I see a distinction between faith and knowledge. My idea comprehends the existence of a God who made the world, as a mystery. The foundation of my faith is the possibility of a God's revelation—what is called the Bible. At times I believe it to be a revelation, and at times not. Sometimes I hold myself responsible to a future life in my conduct, and at times not.

Q. What is the foundation of morality in this world, and its necessity apart from religion?

A. The rights and interests between individuals.

Q. Is there any authority, beyond the nature and necessity of things, for a code of morality?

A. This implies a matter of belief, and there would be no merit in it if it was founded in knowledge, as knowledge excludes the idea of faith. Faith is a condition of the mind.

Q. Do the Scriptures rest upon facts, or upon facts and faith?

A. To attempt to prove the Scriptures by facts in Nature would be ideal.

Q. How, then, can a belief in Scripture be reached?

A. Only by faith. The facts we see in Nature cannot be proven to

Q. Can you account for man's being brought into existence?

A. No, it is beyond thought; we can neither conceive how man could be created, nor how he could remain uncreated. I place this all within the boundary of the knowables. The origin of man is no more to be known than the origin of the materiality of this pen. Forms matter constantly change; matter never changes. There is nothing

from which we can argue the existence of the world or of matter; it is only speculative.

Q. Is the contemplation of God beyond the scope of man?

A. No, for there are men who lead religious lives, and who spend their time in contemplating God.

Q. Have their studies, their contemplation, and their lives, realized any thing toward their knowledge of God, as a Creator and Governor of the world?

A. No, for they all have a different idea of Him.

Q. Have you ever attempted, in your own mind, to represent what you would call God as the Author of Nature?

A. I should think I was making an idiot of myself to try to represent a God, either internally or externally. I assent to nothing but what is reducible to mathematical precision. I must prove it to my senses. I cannot accept any thing not cognizable by the senses.

Q. Have you never gone beyond the range of the senses in your investigations, in the way of speculation and theory?

A. I have, and have also read works on the subject; especially German metaphysics.

Q. In what view have you studied them, and have they thrown any light upon a spiritual Creator or Governor of the world?

A. No, they have only tended to perplex my mind. They did arouse me to thought, and I read them for this, in the hope that from the knowledge I should thus obtain I might obtain relief.

Q. To what particular works do you refer?

A. To Kant and Comte especially, although I read other writers.

Q. Did you accept their philosophy as conclusive?

A. I did. I am aware that a man who arrives at their conclusions may be assumed to be infidel by some people. I do not admit this.

Q. Did any of these philosophers give you any data by which you could better account for Nature as existent than through the works of a Creator?

A. Certain things are within the sphere of my mind, others beyond. I cannot take up the smallest insect, examine it under the microscope, and view its mysterious structure, its beautiful adaptation of parts, without acknowledging its mystery. I am not blind to all this. I recognize this wonderful world and admire its beauties.

Q. Can you any better understand how this insect can come into existence without admitting a Creator?

A. I appreciate the drift of the question, and I might be misunderstood should I answer it. As far as I know, mind is the result of physiological action. Some maintain that the organs are only the media for the spiritual being. My mind cannot be made up definitely. I have already said that there are facts I know, and others that I do not know, and I would be illogical to deny that the mind is the result of growth.

Q. Is there any difference between the life of a plant and that of a man?

A. Fundamentally not.

Q. How as to the question of accountability of life, as represented in man and the plant? The plant is stationary—has no will, or choice; man moving about, and has both will and choice?

- A. I don't like to speak of any thing that I cannot speak positively of.
- Q. In the Greek and Roman myths are represented both good and evil.
- A. How do you account for this?
- A. In the Greek language was involved the entire culture and civilization of the world.
- Q. You do not account for vice and virtue in that answer?
- A. Good and bad are words that have given me more trouble than other, because they are of such wide and general application. This is the difficulty in their analysis.
- Q. In these myths, we not only have vice and virtue represented, but rewards and punishments offered. How do you account in your logical system for the equivalent of these words in the language?
- A. There is no reward or punishment. Those words signify something instead of. Each act has its necessary result, and neither the act nor the result is extraneous.
- Q. How do you account for the human mind in reasoning going beyond the necessities incidental to this life in its expression and consolation to seek a creating power?
- A. Mind expresses absurdities as well as truths.
- Q. How can a mind act absurdly if its existence be simply the result of a physical organization, that organization being necessarily governed by definite laws?
- A. If there were no possibility of error, there would be no need of a guide.
- Q. What is the need of a guide when error has no responsibility—when with the death of the body all existence ends?
- A. This brings up the reserve question. I have the mystery of existence before me. In my judgment that is the end of speculation.
- Q. Is speculation, beyond that, legitimate?
- A. It is as to possibility, but not as to probability of fact. Social sciences remain, even if you believe that death is the end.
- Q. Do you owe any obligations to any being beyond this present for conduct here?
- A. I feel the possibility of it, but the evidence before me is not sufficient to satisfy me that I do.
- Q. Do you believe that there is any rule of action in the conduct of life, that man can adopt, which will enable him to appreciate his possibilities, or understand the relations that he may have to another?
- A. Intelligence is the only guide.
- Q. Do you believe that God has in any way revealed Himself to man?
- A. As I come to see more of the wondrous relation of things, the more the mystery deepens, but it does not help me to any conclusion. The idea of reward for meritorious conduct would prevent me from doing an act, rather than the opposite. The word "reveal" has in my opinion of mythology given me great trouble for ten years, but now the light dawns upon me.
- Q. Is there any law, then, in this life, except civil law, by which we are here amenable for reward or punishment? A. Yes.

Q. Any reward or punishment that should come from any other being except man himself?

A. I see the drift of the question. It involves the same mystery.

Q. Would the fact of another existence, and that existence one of rewards and punishments for your conduct in this life, make any difference to you in regard to your acts?

A. No; I should do as I intended, without regard to the existence of a God or a devil, a heaven or a hell; I have felt this pride during my whole life. I never wished to get any thing out of anybody.

Your commissioners, therefore, in view of the examination, are of the opinion that Edward H. Ruloff is in sound physical health, and entirely sane.

(Signed)

JOHN P. GRAY,
S. OAKLEY VANDERPOOL.

III.

MISCELLANEOUS.

Constitution and By-Laws of the Medico-Legal Society of New York.

CONSTITUTION.

ARTICLE I.

THIS Association shall be known as the New York Medico-Legal Society.

ARTICLE II.

Its object shall be the advancement of the Science of Medical Jurisprudence.

ARTICLE III.

There shall be three classes of members, viz., Resident, Corresponding, and Honorary. Such persons only as are in good standing in either the medical or legal profession, shall be eligible to membership. Physicians and Lawyers, who have been resident members, but who have removed from the city; any persons who shall, by medico-legal or medical or legal contributions to the Society, or by a joint certificate of three resident members, furnish evidence of eminence in their professions, are eligible to corresponding membership. Physicians and Lawyers, of recognized eminence in their respective professions, whether resident or non-resident, are eligible to honorary membership. The number of honorary members shall be limited to twenty, and be equally divided between the two professions.

ARTICLE IV.

Resident members only shall be eligible to office and entitled to vote; all other rights and privileges shall be equally enjoyed.

ARTICLE V.

The officers shall be a President, two Vice-Presidents, styled First and Second; Recording Secretary, Corresponding Secretary, Treasurer, Librarian, Curator, and Pathologist and Chemist.

ARTICLE VI.

The President, or in his absence the Vice-Presidents, in their order, or in their absence a chairman *pro tempore*, shall preside and perform such other acts as are customary for presiding officers. The Recording Secretary shall keep the minutes of the proceedings of the meetings of the Society, and of the Executive Committee; notify officers and members of committees of their elections or appointments, members-elect of their election; certify official acts; and procure signatures, with the President, certificates of membership. The Assistant Recording Secretary shall keep a list of the resident members, give the notices of the meetings, and, in the absence of the Recording Secretary, perform his duties. The Corresponding Secretary shall conduct all the correspondence of the Society, except that with dissenting members. The Treasurer shall have power to employ persons, at the expense of the Society, to collect dues; shall have charge of all money belonging to the Society, pay all its expenses by and with the consent and approval of the Executive Committee; and shall present an account of the financial condition of the Society at its anniversary meetings, together with such suggestions for assessments and further expenditures as he may deem proper. The Librarian shall preserve and hold accessible to the members of the Society all its written and printed contributions. The Curator shall, when he may deem it necessary, preserve, at the expense of the Society, pathological specimens offered to it, and prepare them for exhibition; and he shall subsequently take such measures as the Executive Committee may approve, to permanently preserve specimens possessing medico-legal value.

ARTICLE VII.

The officers of the Society shall constitute an Executive Committee, to whom shall be referred all affairs of business, except those prescribed for the Trustees by the laws of the State.

ARTICLE VIII.

Proposed amendments to this Constitution shall be made in writing at a stated meeting, and referred to the Executive Committee, who shall report upon them within three months. If approved by the Committee, two-thirds of all the votes cast at a stated meeting shall be sufficient for the adoption of the amendments.

BY - LAWS.

ARTICLE I.

Section 1. The stated meetings of the Society shall be held on the second Thursday of every month, unless otherwise ordered by the Society, and special meetings at the time fixed by vote of the Society.

Sect. 2. Stated meetings shall begin at 8 P. M., or as soon thereafter as a quorum is assembled, and special meetings at the hour designated in their order.

Sect. 3. Ten resident members shall constitute a quorum for business.

Sect. 4. Five members of the Executive Committee shall constitute a quorum.

ARTICLE II.—ADMISSION OF MEMBERS.

Section 1. The names of candidates shall first be presented to the Executive Committee. If reported upon favorably by said committee, they shall be balloted for at the time the report is made, or at some subsequent meeting. Two-thirds of the votes cast shall be necessary for an election.

Sect. 2. Every resident member-elect shall sign the Constitution within three months after his election, and, in default thereof, said election shall be deemed void, unless a satisfactory excuse be given.

ARTICLE III.

Section 1. Each resident member shall pay an initiation fee of five dollars, which, with signing the Constitution, shall entitle him to a certificate of membership.

Sect. 2. There shall be an annual assessment of one dollar, unless otherwise regulated by the Society.

Sect. 3. Any resident member who shall neglect to pay his dues or assessments for six months, shall be notified of the fact by the Treasurer; and should he for three months after such notice neglect or refuse to pay, his name may be stricken from the roll of members, at the discretion of the Finance Committee, which shall consist of the President, Recording Secretary, and Treasurer, to whom all questions of indebtedness to the Society shall be referred.

Sect. 4. The ethical rules of the Society shall be the same as those governing the medical profession generally, and those adopted by the Legal Society of New York. The charges against members shall be made in writing to the Executive Committee, who, after due examination into such charges, may acquit, admonish, suspend, or expel the accused from the Society, as they may think proper.

ARTICLE IV.

All papers read before the Society shall be referred to the Publishing Committee, consisting of the President, Recording Secretary, and Librarian.

ARTICLE V.

The annual election of officers shall be held on the second Thursday of October, the nominations having been made at the preceding meeting, and announced in the notices for the anniversary meeting.

Vacancies may be filled at any time by an especial election, the nominations to fill them having been made and announced in the same manner as required for the annual elections.

ARTICLE VI.—ORDER OF BUSINESS.

At the meetings the following shall be the order of business:

1. Reading minutes of preceding meeting.
2. Report of autopsies and exhibition of specimens.
3. Report of Special Committees.
4. Report of Executive Committee, and election of proposed members.
5. Paper of the evening, and discussion thereon; but, at the anniversary meeting, election of officers.
6. New or unfinished business.

ARTICLE VII.

t of autopsies and presentation of specimens shall be
sible. The language of the reporter or exhibitor shall
chnicalities, and made intelligible for non-medical mem-

ARTICLE VIII.

aws may be suspended or amended. Two-thirds of all
at a stated meeting shall be sufficient to suspend them.
dment the same rule and same vote shall be required as
s of the Constitution.

1 Members of the New York Medico-Legal Society.

OFFICERS ELECTED OCTOBER, 1870.

N ROGERS, M. D., President.
SHRADY, Esq., First Vice-President.
DEA, M. D., Second Vice-President.
ROSS, M. D., Recording Secretary.
r WOHLFARTH, Chemist.
' CHAUVEAU, M. D., Corresponding Secretary.
AHAN, M. D., Treasurer.
ERADY, Esq., Librarian.
LARK, M. D., Pathologist and Curator.
. KEMP, M. D., Assistant Recording Secretary.

TRUSTEES.

er, Esq. T. C. Finnell, M. D.
ers, M. D. E. T. Gerry, Esq.
illou, Esq. Wooster Beach, M. D.

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h.	H. S. Downs.	Chas. Henschell.
	J. H. Dorn.	Thomas Hays.
	M. B. Dubois.	W. J. Hadden.
	B. F. Dawson.	B. M. Keeney.
	P. E. Donlin.	J. C. Knox.
	Paluel de Marmon.	Wm. M. Kemp.
ki.	T. C. Finnell.	A. A. Lutkins.
	H. P. Farnham.	John Lynch.
r.	J. Friedrick.	F. D. Lente.
	G. Furman.	S. B. W. McLeod.
ull.	J. C. Forrester.	Daniel McEwan.
l.	J. O. Farrington.	W. M. McLaury.
an.	Emil Gruening.	W. C. McFarland.
on.	Mary E. Green.	Geo. McGahan.
.	Edmund A. Gibbes.	J. C. Morton.
	Wm. A. Hammond.	A. A. Molony.
	S. T. Hubbard.	Lewis Mulot.
	F. E. Hutchinson.	Francis Moore.
s.	M. Hogan.	David Matthews.
	J. J. Hull.	M. J. Moses.

J. F. Morgan.	J. H. Ripley.	S. Teller.
James Mulcahey.	Geo. W. Robinson.	W. F. Thoms.
W. T. Nealis.	James Ross.	T. G. Thomas.
P. Nolan.	Geo. F. Shradly.	Geo. W. Talson.
J. J. O'Dea.	John Shradly.	B. F. Vosberg.
Thomas O'Farrell.	Henry Shiff.	R. A. Vance.
R. J. O'Sullivan.	C. Y. Swan.	Augustus Wohlfarth.
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Stephen Rogers.	E. H. M. Sell.	J. E. Whitehead.
Henry Raphael.	C. P. Tucker.	Mark H. Williams.
H. L. Richardson.	Wm. Thurman.	

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Lewis Beach.	W. F. Kintzing.	Francis Tillou.
J. W. Covert.	Joseph Kotch.	J. H. Watson.
J. C. de LaMarc.	E. J. McGean.	F. C. White.
John Earl.	T. J. McKee.	O. C. Warfield.
J. Flanagan.	J. F. Miller.	R. C. Hutchings.
John Grimbail.	Henry Parson.	
Alonzo Green.	Jacob Shradly.	

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A. Devergie, M. D., Paris, France.	Hon. J. T. Hoffman.
T. Gollard, M. D., Paris, France.	Alfred Vogel (Dorpat Uni- versity), Russia.
John Ordronaux, M. D.	Isaac Ray, M. D.
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R. S. Anderson, M. D., St. Louis, Mo.
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R

THE JOURNAL

OF

PSYCHOLOGICAL MEDICINE:

A QUARTERLY REVIEW OF

DISEASES OF THE NERVOUS SYSTEM, MEDICAL JURISPRUDENCE,
AND ANTHROPOLOGY.

L. V.]

OCTOBER, 1871.

[No. 4.]

ORIGINAL COMMUNICATIONS.

N. I.—*Opinion relative to the Testamentary Capacity of the Late Catharine Fay, of New York.* By CHARLES A. LEE, M. D., formerly Professor of Medical Jurisprudence in the University of the City of New York.

THE frequency of suits at law in our courts of justice, to test the validity of wills on the ground of insanity on the part of testators, is calculated to prejudice most persons, *a priori*, against any suits thus instituted, however clear the evidence and conclusive the proof of such insanity. In the present instance, however, the chain of testimony is so satisfactory, and indeed demonstrative on this point, as to irresistably lead to the conviction that the testatrix had for years labored under that form of mental derangement usually called *monomania*, but gradually and almost imperceptibly merging into what is named *dementia*; that is, a gradual failure and finally total loss of all the intellectual and moral faculties.

The testatrix, Catharine Jackson, by birth, was descended from one of the oldest and most respectable families of New York, being a granddaughter of the late Jacob Harsen, Sen.,

of Harsenville, Bloomingdale. Her advantages of education were somewhat scanty, owing partly to the early decease of her mother. She was unable to make any considerable progress in learning, which was attributed chiefly to a natural deficient intellect, which characterized her during the whole period of her life. Her attainments were limited, in consequence, to a very imperfect knowledge of the first rudiments of learning, such as reading, writing, and spelling, with, perhaps, a slight acquaintance with the elements of arithmetic.

At the age of thirty, or a little later (about 1835), she married, on a very short acquaintance, a gentleman of New York, by the name of Fay, and commenced housekeeping in one of her own houses in Third Street, in this city. This alliance was succeeded by severe domestic troubles and dissensions, which greatly embittered her life, and finally, after three or four years, led to her procuring a decree of divorce, after which she boarded at different places in the city, and with different families, down to the period of her death, in April, 1865, and it is on statements made in evidence, by different members of these families, that the proof of her insanity is chiefly founded. It is, however, proper that the writer of this "opinion" should state that, having been pretty intimately acquainted with the deceased testatrix, from a period considerably anterior to her marriage, down to the time of her decease in 1865, he was able to testify, as an expert, and from his long personal acquaintance, to the fact of her undoubted insanity, and incapacity to make a valid will. It is expected that every medical man, especially those who claim to have made mental diseases a special study, when called on as expert witnesses in doubtful or contested cases like this, should be both able and willing to state in full the reasons on which their opinions are based. In the present instance, the writer feels it due, both to himself and the cause of truth and justice, whose claims are and ever should be paramount in the mind of every true and conscientious man, to set forth the facts and testimony which satisfy him that the testatrix, Mrs. Fay, was of unsound mind, not only at the time of making her will, but for a series of years anterior to

it. And this is especially incumbent, since several, brought upon the stand by the proponents of the will, testified to her sanity in their judgment, though admitted that she was very peculiar and eccentric, both in her manner and dress, and conduct generally. In regard to these witnesses, while it may truly be said that none of them had attracted any special attention to mental affections, and most, if not all of them, had no adequate opportunities of judging of the soundness or unsoundness of the mind of the testatrix, the facts stated by them must lead all unprejudiced and impartial minds, at all acquainted with such disorders, to the inevitable conclusion, viz., the lunacy of Mrs. Fay. It is very true, I believe, in such litigated will cases, where the question of mental sanity is involved, to call expert witnesses on both sides; and, why it was omitted in so important a case as the present, the writer has not been informed, and has no opportunity of judging.

The fact in psychology is more generally admitted than generally, in many cases, of determining whether the mind is sound or unsound, especially to such an extent as to invalidate a will. Frequently, this unsoundness is self-evident, and requires no other proof than the daily conduct and language of the individual; but in other cases the evidence is obscure, and very often contradictory, and the decision difficult. The fact, that insanity is a matter of *degree* as well as kind; that the normal function of the brain, the seat and organ of the mind, passes almost imperceptibly into pathological function; that the health of any of the bodily organs, the lungs, liver, or heart, or of the system generally, passes by slow and unperceptible degrees into seated disease, and functional derangement, and then into organic changes. What is termed "*unsound mind*," as used in the "Revised Statutes" of the State of New York, is undoubtedly that degree of deviation from the normal mental life which unfits for making a valid will, or for entering into other civil contracts, or which exempts from criminal responsibility. The difficulty in criminal cases is, that the crimes are as often committed by the insane as by vicious and depraved individuals; and, of course, both are liable to be judged by the same rule, and supposed to be influenced by

the same criminal motives : whereas, in the one case, the *free* dom of the will is lost, and the power of self-control extinguished ; while in the former the will is free, and the actions wholly involuntary.

It is to be hoped that our legislators, lawyers, and judges, are more enlightened on this subject, than the late Chancellor of England, Lord Westbury, who condemned what he called the evil habit of assuming that insanity was a *physical disease*, and not a subject of moral inquiry.

It is a notable fact that the statistics of insanity, both in Europe and this country, show that in a large percentage of cases, twelve per cent. at least, the subjects of it are naturally very weak-minded ; and in visiting lunatic asylums, both abroad and at home, my attention has been called to the fact that, in an equal proportion of cases, the cranial developments of the patients are either deficient, irregular, or abnormal.

Nearly all the witnesses in the present case conceded that Mrs. Fay was an uncommonly eccentric person ; so much so as to attract general attention in regard to her peculiarities of speech, dress, conduct, etc. It is a matter of frequent experience in our courts that an attempt is often made to prove an eccentric person to be insane, or to show that an insane person is only eccentric, proving how little is generally known in regard to the difference between them. The fact is, that an eccentric person, so called, is one of a strong individuality, and rarely becomes insane, unless insanity is hereditary in the family. Such people are, it is true, emancipated from common and vulgar prejudices ; they act very independently ; not often heeding the praise or blame of the world. If females, they are apt to be called *strong-minded* ; they can give good and satisfactory reasons for all they think, say, or do ; they may have, and generally do have, broad and original views, and great moral courage ; they early belong to the *feeble-minded class* ; they are generally superior to the frivolities, customs, and follies of fashionable society, thinking at all times and acting for themselves. There is, however, a class of eccentric individuals who may and often do become insane. They are those weak-minded, vain, and silly persons, who often affect oddity and eccentricity ; who, naturally of very feeble intel-

3, lack education, intellectual and moral training, culture self-control: many of them are spoiled by indulgence in children; often they become the slaves of their own passions; their minds, unsustained by any moral principles religious faith, readily give way under vexations, trials, disappointments, or loss of friends or property; and, gradually losing all interest in current events or in themselves, they usually sink into a state of torpor, listlessness, melancholy, depression of spirits, alternated with periodical fits of elation; in short, into a state of *monomania*; their minds constantly dwelling on their disappointments and losses (if as they imagine themselves to have sustained), and the individuals who have caused them, and thus they become permanent lunatics.

Such were, in brief, the main facts in the history of the life of late Catharine Fay. Her feeble, uncultivated mind, naturally jealous and suspicious, as such minds usually are, soon became possessed of the notion that she had been unjustly deprived or "frauded," as she termed it, of a portion of her parents' large estate, to which she imagined herself to be natural heir; her mind dwelt upon this subject for several years, to the exclusion of nearly every thing else; it was her constant topic of conversation, wherever she happened to be, in whatever company thrown; and this morbid delusion, in connection, afterward, with many others, ruled and controlled her thoughts and actions, to a great degree, up to the day of her death.

I have alluded to the difficulty in many cases of deciding whether an individual labors under such a degree of unsoundness of mind as, within the meaning of our statutes, to deprive him of the capacity of making a valid will. It is allowable, I hope, to assume that the popular opinion, which sets it for granted that simple, unenlightened common-sense is best suited to guide to a correct decision in these cases, must yield to that followed at present in our courts of law, that special study and observation of the phenomena of mental diseases furnish far more just and reliable grounds for a correct judgment concerning them than prejudice or mere ignorance can.

Nature of Insanity.—Systematic writers on mental diseases have made various classifications of insanity, which are clearly artificial, not existing in nature, and for all medico-legal purposes useless. We might say it is a cerebral affection, ordinarily chronic, and without fever; characterized by disorders of sensibility, understanding, intelligence, will, and the affective or emotional faculties; or, we might define it to be the impairment of any one or more of the faculties of the mind, accompanied with or inducing a defect of the comparing faculties and the moral feelings; or we may say it is a chronic disease of the brain, producing either derangement of the intellectual faculties, or prolonged change of the feelings, affections, and habits of an individual, or both. The general term *mania*, *lunacy*, or *insanity*, includes virtually all the varieties. The terms *monomania* and *melancholia* merely designate forms of the disease, characterized by certain symptoms or phenomena: the first by the mind dwelling chiefly on certain subjects, or one subject; the latter by great depression of spirits; occurring perhaps at regular periods, and lasting a longer or shorter time; succeeded, generally, by a corresponding elevation of spirits, or exhilaration of mind. Such was the kind of insanity under which Mrs. Fay labored. She first exhibited a morbid perversion of the feelings, affections, and habits, with great depression of spirits; profound melancholy, without any particular delusion or hallucination, so far as known; and, for a long time, there was no marked disturbance of the intellectual faculties, though very feeble; but this gradually assumed, after her domestic troubles and divorcement, the distinct form of *monomania* (the *melancholia* of Esquirol), which eventually passed into *dementia*; that form of derangement in which there is great enfeeblement of both moral and intellectual faculties, characterized by failure of memory, judgment, perception, the power of comparison and the healthy association of ideas; indifference to the present or future, and childishness of disposition. Her mind, from its natural feebleness and want of capacity, bordered on imbecility and idiocy, for she made no acquisition of knowledge or new ideas; her mind even appeared to remain the same—in a state of perpetual childhood. Her

ind seemed to be occupied, without ceasing, by unconnected thoughts and evanescent emotions; she was incapable of continued attention or reflection; till, at length, the faculty of distinct perception or apprehension was lost. This statement was made by me on the stand as an expert witness, as the result of personal acquaintance with the executrix for over thirty years, and which continued up till within a few weeks of her decease. It is corroborated by the testimony of a large number of witnesses, produced both by the proponents and constants of her will.

Tests of Insanity.—It is now conceded by the best judges and ablest writers on insanity that there is no single reliable test of this disease—neither the knowledge of good and evil, of right and wrong, the power of design or contrivance, *nor the existence of delusions, illusions, and hallucinations*; these are all of them, regarded singly, as fallacious tests of responsibility. While, then, there is no single test or character not open to objection, and no definition of insanity which furnishes a safe rule for the determination of responsibility, insanity like other bodily maladies being a disease never established by single diagnostic symptom, but by the whole body of symptoms or phenomena, no particular one is necessarily present in every case. *Delusion*, then, which was declared by Lord Erskine to be *the only true test of madness*, and on the existence of which he successfully placed his defence of Hadfield for shooting at the king in Drury Lane Theatre, in the year 1800, is now well known to be fallacious, for there are many cases of insanity where there are no delusions. We must, therefore, look at all the features of mental character—all the marks of mental derangement—all those peculiarities of thinking, feeling, and acting, which distinguish the individual from his former self. We must, especially, carefully scrutinize the acts and conduct of the person, to ascertain whether he can truly discern or judge as to the proper relations of things, or arrive at a knowledge of general truths. From a large mass of testimony taken by the stenographer in the present case I shall only quote such statements as seem, when taken collectively, to establish conclusively the unsoundness of mind of the testatrix, and her incapacity to make a

valid will. (I shall now present some abstracts of the testimony offered by the contestants of the will.)

Testimony of Miss Mary E. Mildeberger.—Miss M., a maiden lady, of high respectability, testified that she had known the deceased from childhood, and been her most intimate friend during her whole life; that she (Mrs. F.) had lived a boarder at many places and in different private families, during the latter period of her life—that she died in April, 1865, over the age of sixty, perhaps sixty-five or seventy; that when she (Mrs. F.) went out, which was generally in summer, she was in the habit of visiting her (Miss M.), at her house, 35 West Fourteenth Street, where she resided; that she (Mrs. F.) was confined to her room the rest of the year; during which she was very low spirited, when she would send for me occasionally; I generally went, and found her in bed; this was in different years; she was, when so confined, always much dejected, in low spirits, said but very little, but when she got out and visited me she was always very much excited, lively, and gay. The last time she called, the 4th of September, two years before her death, she came in very lively, very much excited, and extremely gay; said she was very much fatigued, had walked up all around the park, and back again to my house; she had on a black-silk dress, and a blue-cambric wrapper, as she called it, over, which ladies don't generally wear in the street, with blue bows all down the front, and a large blanket-shawl over her arm, a leather satchel tied up with blue ribbons, an umbrella, and a pair of overshoes. The day was very warm, and it was about noon when she came in; I had company, two ladies and a gentleman, at the time. She said she was too tired to stop, so she sat still a few minutes, and then she kicked off her shoes, she had buskins on, and she took up her dress and danced up and down through the parlors, and extension-room, and said, "I am as young as any one, I feel as though I could fly." My company was present all this time, though I did not introduce her to them. I left her at the house, as I was engaged to go out at the time. She called at my house at other times, when I had company, often at dinner-time, which would prevent my going down to dinner; she would often talk about her grand-

d the Harsens, and would say I must sit and listen to he had to say. She talked much about her cousin, Dr. Harsen, said he had wronged her and her sister, by ; her grandpa to make the will he did make ; though this e same Dr. Harsen that was at one time her agent, and ft her ten thousand dollars by his will. During all this ie was greatly excited, and would throw her arms out, t up and walk around very quickly. She met him once house, and she told him she was a lady, and expected reated like one ; he told her if she was a lady, to try and like one. It made no difference with her whether I npany or not, she would always begin to talk about rsen matter ; she was not at all restrained by the pres- strangers. I have sometimes tried to get her off from pic, but she would feel kind of angry and offended ; must listen to what she had to say. I never succeeded ing her off this topic ; have tried, often unsuccessfully, ge her in conversation on current topics of the day ; ver manifested any interest in current affairs. She her money in a number of small white muslin bags, e kept, each by itself—pennies, five-cent pieces, three- eces, twenty-five cents, etc. ; sometimes she would have i, fifteen, or more bags ; each with the different denom- s of money in them. These bags were small, and if nted to pay, say a dollar or two dollars, she would have e out the bags until she would get the right one, d the proper coin or bill in it. During the summer I have in different years been with her to Taylor's or restaurants, and on entering she would go up to the at she was going to have her refreshments on, take off net, her scarf, and over-dress, and put them on the take off her wrapper as she called it, fold it up, and on the chair, and then say she was going to see the an to give her orders. After giving her orders, she come back to the table, and then she insisted on being upon immediately. If any thing was removed from le at which we sat, she would be very angry, and order placed back again at once.

paying the bills, which she generally did, she would ie money out of these little muslin bags ; she never

counted the change given back, but placed it in the bags where each denomination belonged; I never, in all my dealings with her in money matters—and I have at times kept her money, to the amount of several hundred dollars—I never saw her try to reckon money in a single instance; and when my father paid her money, as he did frequently, being executor to her grandfather's estate, she never counted the money, saying it was all right. In almost every place where she boarded, there was always some misunderstanding and falling out, when she would leave; in all her seasons of melancholy and depression, she never had a physician; and in coming out of them, she did so suddenly, never appeared emaciated, or wasted by disease; she would be right up and lively. She was always talking about the Harsen property, and being wronged by the family—this was the case, to my knowledge, for more than twenty years. She employed a lawyer by the name of Allen to transact all her business for her; she was not only very eccentric, but also very childish; she would come to my house and bring papers of candies, and hand one to one person, and another to another, like a little child; and she was like a child when she was stubborn, you could not do any thing with her; she was self-willed, and would have her own way. She could sign her own name, but I never saw her read a book. By her behavior and strange manner of dress she would attract the notice of people, and often speak to people she ought not to.

Testimony of Miss Sarah Carter.—Miss C., a maiden lady, residing at 35 West Fourteenth Street, had known Mrs. Fay for five or six years; when I first saw her, at the house of Miss M., where I live, she had on a black-silk dress and a baby's knit cloak, white, with blue border; she always carried an umbrella, tied in the middle with some kind of string, not put up neatly, as most people carry them, but loose; said she carried it to keep the men off (with a gesture, poking it out). Her dress was very short, especially in the back; she wore low shoes, not slippers; she carried a shawl and leather bag, decorated with blue ribbons and festoons across from the back to the handle—a sort of black leather travelling-bag. She always carried a shawl on her arm, and overshoes tied

her with a string in her hands. The expression of her was restless, wild, unsettled, and vacant: when she called always began to talk very excitedly about the Harsens Palmers; there was no connection between the sentences said, and no sense could be made of it, nor could it be understood, so rapidly and disconnectedly did she talk. I asked her questions frequently, but she would not seem to understand the questions at all; she would stare at me for a moment, and then her eyes would wander off, and she would talk of some other subject. I never was able to get her to answer a single question; she never seemed to understand me. Her conduct seemed to me irrational.

Testimony of Thomas Mildeberger.—Lives at Tarrytown; formerly lived at 80 Carmine Street, New York; am sixty-years old; Mrs. Fay formerly boarded at my house; I paid her board herself from a roll of bills—sometimes it cost me too much by ten or fifteen dollars—sometimes not enough; I never counted the money; I never saw her count or read. One day she came into the backroom, crying and rubbing her eyes; she went into the backyard, hallooing and screeching, her sister was dead—she had been dead four days.” I told her I had seen her sister that day, and she was alive and well. She persisted in declaring her sister was dead, and had been in the house four days; she went on hurraing and laughing and made such a disturbance that I went and brought her to her. When she came in, Mrs. Fay seemed somewhat shocked at seeing her alive, when she believed she was dead, but she went on almost as wild as she did before I brought her here. This state of things continued two or three hours, until, near eleven o’clock at night. Have seen her frequently since she left my house; she was always full of her talk, getting up and jumping round the office; her conduct seemed to me irrational.

Lester E. Mildeberger, daughter-in-law of the above witness, testified that when her mother-in-law was very sick and confined to her bed, Mrs. Fay would place herself at the head of the bed, and, sitting bolt upright, would sit there for many hours, looking steadily at Mrs. M. without saying a word; I never heard her talk on any subjects but two, viz., the Har-

sen estate and the Palmer family (she had imagined that Palmer, with whom she then boarded, wished or threatened to turn her out of his house). Her manner was always excited and wild; she would be much irritated if any question was asked her when talking; when interrupted, she would always go back and begin again, and go over all she had been saying, telling you to look her straight in the eyes, not interrupt her again; the expression of her eyes was wild and excited. She said she was having a vault built, large enough to hold eighty people; she wanted room enough in so that if she felt inclined to get up and dance, she could; said the reason she had the vault built was that the Harsen family had offended her so much that she wouldn't lie in the same vault with them; she said she would have a ventilator made in the roof, so that if she saw any of her friends coming she could go up there and wave her handkerchief, and let them know she was there. She once came into my husband's office in a very wild and excited manner, and said, "See! you see there is a snake that has been following me all the way with Jacob Harsen's head on it." We told her we didn't see any, that it was not so, and she became very wild, and acted like a crazy person, and screeched and screamed, and ran in the yard, so that the neighbors all raised their windows to see what was the matter, and then, after we got her quieted down, she said she knew her sister Ann May was dead, and had been four days; that she had had a vision she knew it was so. She didn't get quieted till even then; she said she had been born with a veil or caul over her face (a portion of the after-birth), and was gifted so she could see things beforehand, and could foretell whether there was to be any affliction, or trouble, or death, in the future; she got this gift from a higher power. She was repeating the same story about the Harsens and Palmer in the same words, never varying in the least; never saw any thing to write, or engage in any amusements, as music, etc.

Mrs. Caroline Mildeberger, wife of Thomas Mildeberger, testified that Mrs. Fay lived in her family thirty years as a boarder; that she was mostly confined to the house in winter, and was going about all the time in

fore part of winter she got into one of these spells she very year for many years; that she would keep her room many weeks together—sometimes two months or more. When she was in her right mood, she would take her meals with the family; at other times, meals were sent to her. She called in a physician. When she came down to her room, she always looked wild and flighty; would make no sense when I said to her, “Good-morning, Catharine,” but would get up of her coffee and whip up-stairs, and we would not see her again during the day; her hair would be all topsy-turvy, her clothes would look as if they had been washed and dried out, and she wouldn’t take off her clothes for two or three days together. She always locked herself in her room, would allow no one to come in—refusing sometimes to open the door, because, she said, it was a dull day, although the sun was shining bright and pleasant. Once she locked herself in her room from Saturday night until a week from the next Saturday night, and nobody went in her room, and nobody came out, and no food was sent in; she wouldn’t allow any one in her room at all, and wouldn’t open the door; she had not come out in all that time; at that time she had not been out of her room in six or seven weeks; we tried every day to enter her room, but could not succeed. Finally, on making an entrance, we found she had been in bed all this time. She came out of bed with her dress all wrinkled up, and she was in a wild kind of a state. She was in the habit of going away without her breakfast; if asked to stay, she would say, “No time, no time;” she returned in the evening, between six and seven; in summer she generally spent the day in her room. As to dress, she would sometimes have on a sack, and she would wrap one or two scarfs of different colors over that, and her head would be generally tied with yellow and blue and white ribbons, all these streamers hanging, and she would have on a plaid shawl thrown over her arm, and she would wear a thinner shawl. I have known her to have as many as three shawls on her arm at once going out, and then she had a pocket-book she used to carry, and that she would have in her hand; besides, also, she would have a bundle tied up in a paper, and an umbrella and a parasol. That used to be her rig in sum-

mer-time; you would think she was moving. In reply to my question why she needed so many things, she said, "If it was warm, she needed them; and if it was cold, she needed them." She went out in the hottest weather, equipped in this manner. I have seen her thus in Broadway, with people looking after her, and boys running after her; she generally took the middle of the sidewalk, and carried her umbrella straight across her arms, giving, as a reason, "If any one came along, she wanted to shove them off with it;" she "didn't want them to run her down; she was entitled to her part of the street."

She used to have her "reception-days"—days for ladies to call (she was out so much); there was but one, an old lady—Miss Hegeman, and she made as much parade as if she was going to receive New-Year's calls; she had a table set, and there was every thing on it—all kinds of cake, fruits, nuts, almonds, and lemonade, and she cracked about half a peck of hickory-nuts. She dressed herself to receive this lady, and after she got dressed for the call, she came down into the parlor; her dress was a green delaine, with a very gay figure in it; and then her neck was dressed with a little silk handkerchief or cravat, pinned on, and then a collar over that; and then she had blue, yellow, and white ribbons all put over this, and pinned away down as far as she could get them; and four pins or brooches, you might call them, one above the other; and she had on a hat, and that was trimmed with straw-color, blue, and white, the same as she had on her neck, and the scarf was lilac; and then she had on a pink cambric-muslin apron, such as are used for lining dresses, and that was trimmed with fringe of an old parasol—white-silk fringe as yellow as it could be—and she had a lilac ribbon fastened to that, and tied in a bow behind; and that was her dress to receive Miss Hegeman.

She would often dance, or jump around from one room to the other, back and forth, holding up her dress, jumping as high as this railing (nearly two feet), and she used to cut quite a fantastic figure, and she went round and sung, "Diddle-dee—diddle de-dee," and that was always her tune, and she could sing nothing else—this often continued for half an hour at a time; she had never learned to dance; this only occurred in her season of excitement or exhilaration.

During rainy days, when she sometimes stayed in the house, I have known her change her dress a dozen times in the course of the day. She would put one rig on in the morning, come down-stairs, and dance round, until she got tired, then go back, and in half an hour come down with another rig on, and I have known her do this from ten to a dozen times during the day; some of the dresses she wore when sixteen; her bridal dress also, and old-fashioned things, all these she would put on, dance round the room, and cut up, and then go back again. During all the time I knew Mrs. Fay, I never saw her try to read any book, or to write; never knew her go to church; the general topics of her talk were her troubles, and the Harsen estate. Her conversation never was connected in any way; no matter what she talked about, she suddenly changed from one thing to another—would go on for a minute, then suddenly stop and exclaim, “O there,” and commence again, and talk on what she had just before; she never kept straight on in any thing she undertook to say; it was always the same thing, the same words, insisting on my paying close attention—“Sputter, sputter, sputter,” and “Rather, rather, rather.”

She never would allow me to say any thing, nor would she listen to me if I did; if I commenced to speak, she commenced. I have seen her wild as she could possibly be, and pointing behind her ask if I saw “that snake, that big black snake,” “it has just come all the way from Palmer’s, and it is Dr. Harsen turned into a black snake”—“there it is now.”—I got her into the back-parlor and tried to pacify her, but couldn’t—she shrieked, and screamed, and run out into the yard, and the neighbors all hoisted their windows, and looked out to see what was the matter. She wrung her hands and jumped up and down, and screeched, as loud as she could, that “that snake was after her, and to take it off.” Mrs. M. testified at great length, and to the same facts as her husband, that she had the gift of prophecy, could foresee all events, and tell if any thing was to happen, any death or trouble in the family; said this very often, and had said it for fifty years or more. Mrs. Fay told her she was building a vault, that would hold eighty people—so she could have plenty of room,

and she was going to have no one lie there but herself; that she was going to have a ventilator in the top, that she might go up there, and look out—and if any one was coming, she would beckon and let him know she was there; said she had placed her vault so near Dr. Harsen's, that if she had a mind to, she would break a hole through, and go in to him; that she would get ahead of him there. Mrs. M. closed her testimony by saying that she regarded Mrs. Fay's conduct as very *irrational*.

Testimony of Mary C. Lounsbury.—Testified that she knew Mrs. Fay from June, 1865, to the time of her death; that she rented her a house in Bloomingdale, in the summer of 1865. When I first saw her at my place, I thought her a very singular person; she had on a very queer, old-fashioned bonnet, faded flowers, entirely out of fashion, very short dress, and white stockings, and an old-fashioned, striped shawl, very low shoes; she said she would take it before she entered it; said she was the granddaughter of Mr. Harsen, and could give good references; she immediately began crying and talking about the Harsen and Palmer family; that the latter had turned her out of her house. I then took her through my house, and showed her the rooms, she talking wildly and rapidly all the time about her troubles, the Harsens; taking little notice of any thing, nor saying a word respecting the house and the business she came upon; she continued crying, and left, after a while, saying she would be out again in a few days; there were seventeen rooms in the house, an old-fashioned, double-house; she said she wanted it all for herself, and no one with her; I rode down town with her to her agent's office (Mr. Allen's), during which she talked incessantly, stuttering and stammering, and completely drowning my voice if I undertook to say any thing.

On leaving Mr. Allen's office, where the papers were drawn up and signed, I whispered to him, going down-stairs, and asked if Mrs. Fay was not deranged. He said no, it was her peculiar manner. She would have fits of crying and hysterics frequently, when I would quiet her as I would a little child; her eyes had a peculiar wild glare, which frightened me greatly, having often seen it in patients in the Bloomingdale

atic Asylum near by my house. Her talk was always on subject, how bad she had been treated by the Harsens Palmers; she always did all the talking. In about a week she took to her bed, getting up in the morning only occasionally; the second week she kept her bed altogether, and intended to do so till November, when the weather became cold. She would not allow my domestic or any one to go in her room, nor would she allow my servant even to stay in the room. Mrs. Fay screeched and screamed so much at night, finally the servant would only stay in the daytime. I asked Mrs. Fay why she screamed so much at night; she said she had "visions" sometimes, and sometimes the "nightmare," "wonderful visions;" said she was "gifted from a higher power;" her windows were tightly closed with boarders, so there was not a breath of air in the room; she kept the room entirely dark, because, she said, she "was afraid of some one looking in the window;" she called them "spirits," or "spooks," or something of that kind. She slept on two large feather-beds night and day all summer, without a breath of air in her dark room, bathed in perspiration, and if I opened the door or window a little, to admit fresh air, for I said she would inevitably die, she would burst out crying; finally sunk into a kind of lethargy, or torpor, or stupor, said nothing; I could get no response from her whatever; thus lay in bed continuously all summer, without getting up unless I forced her to get up, to have her bed made. I sometimes succeeded in getting her up once a week, sometimes twice a week, and then not at all, saying she "felt so weak." She never had a physician all this time, nor asked for one. Fearing she would die, I went for Mr. Allen, and he came out, and saw her in her room alone; stayed some time; and after, a day or two, Mrs. Fay said she felt very weak, she must go down and see Mr. Allen; she had agreed to do so, and he was to send for her. The carriage came with Mr. Allen in it; I helped her dress, and she went off with him in the carriage together. This was some time in September. Mr. Allen returned about nine o'clock. (This was the time when she made her will.) In the course of two weeks she was up again, and in a high state of exhilaration, "in as much

ecstasy as she had been depressed;" "she would dance, throw up her arms, and toss her head all at once, with a ringing laugh, and that same glare or glassy state of the eyes." In two weeks more she left my house, and went to board at Mr. Finsents's in Sixth Avenue.

Remarks.—The present case of *unsoundness of mind*, if it serve no other useful end, may suffice to show that the present artificial classification of mental diseases is wholly unnatural; assuming a fictitious exactness, calculated rather to lead to error than subserve the cause of psychological science; or, indeed, lead to any valuable practical results. It proves, moreover, that the proposal of Dr. Maudsley, in his recent able work on the "Physiology and Pathology of the Mind," to divide insanity into two great classes, namely, insanity without positive delusion, and insanity with delusion—in other words, into *affective* and *ideational* insanity—is no more scientific or accurate than those classifications already existing. Here was a case of "*affective*" or "*pathetic*" *insanity*, with delusions, in connection with "*ideational insanity*;" combining, in its progress, nearly every form of mental derangement, "degeneration of the mental organization, or deviation from healthy mental life," known to science, these different forms being at times intermixed, succeeding or replacing one another. Here was weak-mindedness, gradually merging into moral alienation, with melancholy, depression, without delusion; and this gradually running into monomania and melancholia with delusion; and this, again, terminating in *dementia*. In this case we have the two distinct forms of monomania of Esquirol, namely, that characterized by extreme exhilaration of spirits, or gayety; and that characterized by extreme depression, or melancholy; each running a stated course of weeks or months together; then the existing mood suddenly changing into its opposite. This case, therefore, may be taken, perhaps, as representing a typical example of madness—one where the disorder, commencing in emotional disturbance and eccentricities of action, in derangement of the affective life, gradually thence passed into *melancholia*, or *monomania*, and finally into *dementia*. It shows, moreover, that insanity, like other diseases, has its different stages, char-

acterized by different symptoms, running its particular course, its phenomena at each stage requiring special prognosis and special treatment. These varying symptoms are not to be regarded as special pathological entities, or different forms of mental disease; but the same disease, with different manifestations.

I assume that the testimony offered in the case of Mrs. Fay proves incontestably that she labored during a considerable period of her life under *partial ideational insanity*, including delusion accompanied by an exalted passion, and delusion accompanied by a sad and oppressive passion—*monomania proper*, and *ordinary melancholia*: in the former mood her exalted self-feeling becoming embodied in a group of delusions, testifying to an overweening self-esteem; in the latter mood she was overcome by the weight of the sad and melancholy emotions that oppressed her; she labored under illusions of the senses; delusions and hallucinations; was troubled with chimerical fears, frightful dreams, phantoms of the imagination; at times, she went more than an entire week without taking a particle of nourishment—being, probably, restrained from eating by some strange hallucination; in both moods her will was inflexible; nothing could subdue it, neither reasoning, nor solicitations of the most affectionate tenderness, nor threats—nothing could remove her prejudices, her repugnances, nor her aversions—nothing could triumph over her errors, alarms, delusions, or fears. She was indifferent to all consideration of moral duty or physical health. Nothing could divert her from the engrossing thoughts that occupied her childish mind. Her delusions were often of the strangest and most unnatural character. She could see plainly a black snake following her all day, with the head of her cousin, Jacob Harsen, attached to it, and could not be convinced of the absurdity or impossibility of such a phenomenon. She could believe that she was gifted from on high, and foresaw future events, and the death of her sister; and could not be persuaded that she was mistaken in the possession of such a gift or power, even after she saw her sister alive and well. She saw no absurdity in constructing two vaults for her own indi-

¹ Testimony of Mrs. Caroline Mildeberger.

vidual use, each large enough to contain the bodies of eight individuals; nor of the improbability of dancing about in the after she was dead, nor of looking out at the ventilator and seeing her friends when they came to visit her; nor of being able to dig through into Dr. J. Harsen's vault adjoining. When she visited a Sunday-school one Sabbath morning and the children were noisy and disorderly, she said afterward to the family where she boarded, on her return, that it was a shame for children to behave so, and make so much noise, when her cousin Cornelius Harsen lay sick in Peekskill. On occasion of an alarm of fire in the rear of the premises where she boarded, she made no effort to secure her valuable papers or her clothing, but merely put on a small apron with pockets in the side; and, when the alarm was over, asked if she had not shown great coolness and presence of mind in putting on that apron, as if it had some charm in it to protect her against fire. One of the peculiarities of her insanity was her fondness for fantastic dress and show, without the slightest regard to propriety, fashion, or comfort, or the protestations of her friends. She never heeded or took any advice in regard to dress, but, arrayed in her short gown, low shoes, white stockings, travelling basket or bag, with overshoes, blanket-shawl, and a large umbrella across her arm to protect herself against those who came too near, with numerous different-colored ribbons streaming from her hat and cloak, she took the entire of the walk, the "observed of all observers," with boys following her, people staring and wondering what sort of a character she could be. Thus, for years, she traversed the streets, during that portion of the year when she was out of her bed, under the name of "the crazy lady." And this woman, overlooking her friends and relatives, especially an only sister, to whom she had always been much attached, was induced to sign a will giving all her property to her lawyer, who had been her agent, collecting her rents and doing other business for her: the will having been drawn by the legatee, and witnessed by two persons who had never seen the executrix previously, nor had any opportunity of judging as to her sanity or insanity!

ART. II.—*A Letter to the Editor on some Recent Contributions to Mental Science, Medical Jurisprudence, and Anthropology.* By GEORGE EDWARD DAY, M. D., F. R. S., late Professor of Medicine in the University of St. Andrew, etc.

THE "Physics and Physiology of Spiritualism" is universally regarded in this country as incomparably the best exposure of the follies of the believers in spirit-manifestations that has yet appeared. It has been most favorably reviewed in the *Journal of Mental Science*, the *Medical Times and Gazette*, the *British and Foreign Medico-chirurgical Review*, etc., and has formed the basis of two articles in the *British Medical Journal*. Strangely enough, just as this valuable little book is attracting general attention, Mr. Crookes, the discoverer of the metal *thallium*, and the editor of the *Chemical News*, and of the *Quarterly Journal of Science*, has brought out a continuation of his researches respecting "certain phenomena inexplicable by any known natural law," which he commenced a year ago. He then pointed out that men of science had a right to demand that these phenomena should be tested by the balance, and that some exhibition of power equivalent to so many foot-pounds should be manifested in his laboratory. He has, since then, been pursuing this investigation, and has applied careful testing experiments to some of the inexplicable phenomena. He has thus obtained the very remarkable results which I shall now briefly describe, and which appear (according to him) to establish "the existence of a new force, in some way connected with the human organization, which for convenience may be termed the Psychic Force."

Of all persons endowed with a powerful development of this force, Mr. Home is the most remarkable, and it is mainly by observations made on this well-known gentleman that the existence of psychic force has been established. Even on him the manifestations of the force are very capricious, and a result obtained at one sitting cannot be necessarily obtained at another.

Among the most remarkable phenomena occurring under his influence are: 1. The alteration in the weight of bodies;

and 2. The playing of tunes upon musical instruments (generally an accordion), without direct human intervention. Not until Mr. Crookes had witnessed and scrutinized these facts some half-dozen times did he become convinced of their objective reality. He then began experimenting as follows:

1. He constructed a cylindrical wire-cage, with meshes two inches by one, which was about two feet in diameter, and of such a height that it could just slip under the dining-room table; and he bought a new accordion. The room was lighted with gas; the temperature varied from 68° to 70° Fahr.; and those present were Mr. Crookes, his brother, and his assistant, Dr. Huggins, the astronomer, Mr. Sergeant Cox, an eminent lawyer, and Mr. Home. Mr. Home sat in a low chair at the side of the table, under which, close in front of him, was the cage, one of his legs being on each side of it. Mr. Crookes sat close on his right, and Dr. Huggins on his left hand, and each kept a foot resting on the feet of Mr. Home, so as to detect his least movement. "Mr. Home took the accordion between the thumb and middle-finger, at the opposite end to the keys. Having previously opened the bass key myself" (says Mr. Crookes), "and the cage being drawn from under the table, so as just to allow the accordion to be passed in keys downward, it was pushed back as close as Mr. Home's arm would admit, but without hiding his hand from those next to him. Very soon the accordion was seen by those on each side to be waving about in a curious manner; then sounds came from it, and finally several notes were played in succession. My assistant, who was under the table, reported that the accordion was expanding and contracting. Mr. Home's hand, which held it, was seen to be perfectly still, his other hand resting on the table."

The instrument was then seen moving about, going round and round the cage, and playing at the same time, Mr. Home's hand remaining perfectly still. A simple air was then played, and, as this must have resulted from the different keys being acted on in harmonious succession, this was considered by those present as a crucial experiment. The sequel was, however, more wonderful, for Mr. Home let go the accordion, removed his hand from the cage, and placed it in the hand of

the person sitting next to him, and yet the instrument continued to play!

Mr. Home again held the instrument in the cage as before with the keys downward, and an electric current from two Grove's cells was passed round the cage. It immediately sounded and moved vigorously, but whether the electricity assisted the manifestation of force inside is doubtful. He then again removed his hand, when the accordion continued floating about with no visible support. After a time he reinserted his hand, and took hold of the instrument, which then commenced to play, at first chords and runs, and afterward a well-known sweet and plaintive melody, which it executed perfectly in a very beautiful manner; Mr. Crookes's hand being at the time on the top of the accordion in contact with Mr. Home's fingers, which were motionless.

2. In another part of the room an apparatus was fitted up for experimenting on the weight of a body. It consisted of a mahogany board or lever, thirty-six inches long, nine and a half wide, and one inch thick, with strips one and a half inch wide, at each end, forming feet, and at the near end constituting a fulcrum. One end rested on a strong table, while the other was supported in the air by a spring-balance hanging from a tripod stand. The apparatus was arranged so that the board should be horizontal, and in this position its weight was three pounds. The accordion-experiments having been concluded, Mr. Home, who had never previously seen either this apparatus or the cage, placed the tips of his fingers lightly on the extreme end of the board that was resting on the table, while Mr. Crookes and Dr. Huggins sat, one on each side of it, watching for any effects that might ensue. Almost immediately the pointer of the balance descended, after a few seconds it rose again, and this movement was repeated several times, as if by successive waves of the force. The end of the board was, moreover, seen to oscillate slowly.

To show that he was not producing the downward pressure, he took a small hand-bell and a little card match-box, and placed one under each hand. The slow oscillation of the spring-balance became more marked, and Dr. Huggins saw the index descend to six and a half pounds, showing an addi-

tional pull downward of three pounds. A few moments afterward the index descended as low as nine pounds, showing a pull of no less than six pounds. In order to see whether it was possible to produce much effect on the balance by pressure on the place where Mr. Home's fingers had been, Mr. Crookes stood upon the table, resting with one foot at the end of the board. His weight, one hundred and forty pounds, so applied, sunk the index one and a half pound or two pounds, when he jerked up and down. As Mr. Home was sitting in a low easy-chair, he could not have exerted any influence by his mere pressure with the fingers, and it was especially remarked that they never were advanced more than one and a half inch from the extreme end, so that any downward pressure could never be exerted beyond the edge of the table, or in such a way as to affect the balance. Again, it is clear that, when the distal end sank, the board would turn on the farther edge of the foot resting on the table, as on a fulcrum. If, therefore, he had exerted a downward pressure, it would have been in opposition to the force which was causing the other end to move down. The slight downward pressure shown by the balance when Mr. Crookes stood on the board was doubtless owing to his foot extending beyond this fulcrum.

In his paper, entitled "Experimental Investigation of a New Force," and just published in the *Quarterly Journal of Science*, he only describes the above-recorded results of a single sitting; but for some time past he has been making similar experiments with like results. From the fluctuating character of the force, it is impossible to predict certain results. At the first meeting of scientific men at Mr. Crookes's house, the results were as negative as those at the St. Petersburg *séance*; but the trials were patiently repeated, till the remarkable results we have now recorded were obtained on apparently the third sitting.

Since the publication of the preceding experiments, Mr. Crookes, in continuing his observations, has devised an apparatus by which it is impossible for the balance to be affected by any pressure of Mr. Home's fingers, because the force emanating from that source is transmitted through water intervening between his hands and the board. It is difficult to explain

he arrangement without a diagram, but the following is his verbal description : Over the centre of the fulcrum he placed a glass vessel full of water, and, by means of an iron stand quite detached from all the rest of the apparatus, a vessel of copper was held so that it dipped into the water without touching the sides (or bottom) of the glass vessel. The bottom of his copper vessel was perforated with holes, in consequence of which it was partially filled with water, and it was upon this water that Mr. Home laid his fingers. With the apparatus thus arranged, the board oscillated as in the previous experiments, the average strain registered being three or four pounds.

When Mr. Crookes was trying the above experiment, it occurred to him to ask Mr. Home to put his hands on the table, and not to touch the apparatus at all. Under these conditions, the board moved as before.

On the 7th of July, Mr. Crookes, in the presence of Mr. Durham, teacher of Chemistry and Physics at the City of London School, and other friends, tried some similar experiments on a female medium—a private lady. The weight-experiment was tried without the water, the medium putting her fingers on the short end of the lever, where any pressure would have decreased, instead of increasing, the weight registered by the spring-balance. He put his hands on hers, to make sure that she did not move them. The other end of the board went down at least a dozen times, taking about four seconds for each oscillation. Most of the downward pulls were about two pounds ; the strongest one that was registered amounted to six and a half pounds. Every one present watched the medium's hands, and saw that her fingers were at the extreme end of the board, and never approached the fulcrum. Once or twice the end of the board under the fingers rose with the fulcrum from the table, while the other end was being pulled down.

The lady then performed experiments on the accordion, similar in all essential points to those of Mr. Home.

I have taken the account of the last set of experiments from what the readers of this JOURNAL may think—and as I myself think—a somewhat questionable authority, viz., *The*

Spiritualist for July 15th ; but, from a note with which Mr. Crookes has favored me (in answer to certain questions suggested to my mind by his paper), I have no doubt that the report I have given is a fair representation of what actually took place. Mr. Crookes further tells me that he is engaged in bringing "the raps to a crucial test." After noticing the difficulties attending the investigation, he observes : "I know a dozen ways in which sounds somewhat like them can be made, but no plan that I know will give them on objects in a room at some distance from the medium, or will produce them on any stretched membrane. Within the last week" (his note is dated July 18th) "I have got registrations of these noises on an instrument, with two separate mediums."

Considering the high scientific status of Mr. Crookes and Dr. Huggins—that they are men whose lives have been devoted to working with the most delicate philosophical instruments, and that they have taken up the inquiry with minds totally devoid of any desire beyond that of investigating the truth of certain puzzling but apparently undeniable phenomena, and with a certainty that they shall be exposed to the ridicule of many of their friends—it is needless to say that these experiments are exciting a large amount of interest throughout the country. As our readers may like to know what are the views of Mr. Crookes as to the possibility of these phenomena being due to spirit-influences, I may quote a sentence or two from a letter (dated July 10th) which he addressed to Mr. C. Varley, the eminent electrician (an avowed spiritualist), and which has been since published. "You press me" (he observes) "on a subject to which I have hitherto avoided referring, viz., the association of psychic force with intelligence. I have avoided writing any thing which could fairly convey an opinion adverse to the views of spiritualists. At present, I wish to reserve my opinion on the causes of the phenomena until I have submitted the facts themselves to sufficiently accurate scientific tests. In the mean time, I submit the psychic-force theory as common ground, on which all parties may meet. . . . But how that force is actuated and controlled—whether the mind of the psychic can exert a power over material things outside the body ; whether it can

Quit the body for a season and produce the results we see ; or whether the psychic force can be wielded by other invisible and immaterial beings, who are thus temporarily enabled to manifest themselves to us—are problems of vast interest in the future, but which, I firmly believe, will yield solutions when intelligently submitted to scientific experiment.”

I am inclined to think, from the perusal of this letter, which I have only this day (July 25th) seen, that Mr. Crookes will ultimately retreat to the spirit-hypothesis ; but, even if he does so, I for one am—and I believe all that know his high character will feel—assured that he is acting up to his honest convictions.

However deficient Mr. Home may have been in psychic force when in St. Petersburg, he now seems to have it in superabundance. Lord Lindsay invited Lord Adare and some other friends to his laboratory on the 11th of July, to meet Mr. Home, on which occasion he (Mr. H.) was able to see a powerful magnet in a totally dark room, into which he had just been brought. “Give me your hand” (he said to Lord Lindsay), “and I will show you exactly where I see it ;” and he did so. Lord Lindsay declares that, on another occasion, also in the presence of Lord Adare, Mr. Home fell into a trance, “and in that state was carried out of the window in the room next to where we were, and was brought in at our window. The distance between the windows was about seven feet six inches, and there was not the slightest foothold between them, and they are about seventy feet from the ground.” A Mrs. Guppy, of Highbury, a very stout lady, and a powerful medium, beats Home out of the field. She was recently transported from her home to Holborn, a distance of between two and three miles, and dropped down through the ceiling on a table surrounded by eleven spiritualists !

Those who desire further information regarding this wonderful journey of “one of the stoutest ladies in London,” will find full details in *The Spiritualist* for June, a periodical abounding in wonders that make the hair stand on end. The truth of the story is attested by eleven witnesses, whose names and addresses are given, and several of whom are persons of undoubted respectability and education, who clearly would not be guilty of conscious false statements.

For my own part, I can only say that from my youth upward I have been a sad sceptic in such matters, and if, in my old age, I adopt the spiritualistic creed, it will be on the principle of Tertullian: "Credo quia impossibile est."

From these topics I gladly turn to notice an eloquent lecture, recently delivered in the Royal Institution, by Prof. Huxley, on "Bishop Berkeley on the Metaphysics of Sensation." The following extracts will serve as fair samples of the whole lecture, which is published in *Macmillan's Magazine* for June:

"The key to all philosophy lies in the clear apprehension of Berkeley's problem, which is neither more nor less than one of the shapes of the greatest of all questions, 'What are the limits of our faculties?' And it is worth any amount of trouble to comprehend the exact nature of the argument by which Berkeley arrived at his results, and to know by one's own knowledge the great truth which he discovered—that the honest and rigorous following up of the argument which leads us to materialism, inevitably carries us beyond it.

"Suppose that I accidentally prick my finger with a pin. I immediately become aware of a condition of my consciousness—a feeling which I term pain. I have no doubt whatever that the feeling is in myself alone; and if any one were to say that the pain I feel is something which inheres in the pin, as one of the qualities of the substance of the pin, we should all laugh at the absurdity of the phraseology. In fact, it is utterly impossible to conceive pain except as a state of consciousness.

"Hence, so far as pain is concerned, it is sufficiently obvious that Berkeley's phraseology is strictly applicable to our power of conceiving its existence—'its being is to be perceived or known,' and 'so long as it is not actually perceived by me, or does not exist in my mind, or that of any other created spirit, it must either have no existence at all, or else must subsist in the mind of some eternal spirit.'

"So much for pain. Now let us consider an ordinary sensation. Let the point of the pin be gently rested upon the skin, and I become aware of a feeling or condition of consciousness quite different from the former—the sensation of what I

all 'touch.' Nevertheless, this touch is plainly just as much in myself as the pain was. I cannot for a moment conceive this something which I call touch as existing apart from myself, or as being capable of the same feelings as myself. And the same reasoning applies to all the other simple sensations. A moment's reflection is sufficient to convince one that the smell, and the taste, and the yellowness, of which we become aware when an orange is smelt, tasted, and seen, are as completely states of our consciousness as the pain which arises if the orange happens to be too sour. Nor is it less clear that every sound is a state of the consciousness of him who hears it. If the universe contained only blind and deaf beings, it is impossible for us to imagine but that darkness and silence should reign everywhere.

"It is undoubtedly true, then, of all the simple sensations that, as Berkeley says, their '*esse is percipi*'—their being is to be 'perceived or known.' But that which perceives, or knows, is mind or spirit; and therefore that knowledge which the sense gives us is, after all, a knowledge of spiritual phenomena.

"All this was explicitly or implicitly admitted, and, indeed, insisted upon, by Berkeley's contemporaries, and by no one more strongly than by Locke, who terms smells, tastes, colors, sounds, and the like, 'secondary qualities,' and observes, with respect to these 'secondary qualities,' that 'whatever reality we by mistake attribute to them [they] are in truth nothing in the objects themselves.'

"Let us try (he subsequently observes) to work out Berkeley's principles for ourselves, and inquire what foundation there is for the assertion that extension, form, solidity, and the other 'primary qualities,' have an existence apart from mind. And for this purpose let us recur to our experiment with the pin.

"It has been seen that when the finger is pricked with a pin, a state of consciousness arises which we call pain; and it is admitted that this pain is not a something which inheres in the pin, but a something which exists only in the mind, and has no similitude elsewhere.

"But a little attention will show that this state of consciousness is accompanied by another, which can by no effort be got

rid of. I not only have the feeling, but the feeling is localized. I am just as certain that the pain is in my finger, as I am that I have it at all. Nor will any effort of the imagination enable me to believe that the pain is not in my finger.

"And yet nothing is more certain than that it is not, and cannot be, in the spot in which I feel it, nor within a couple of feet of that spot. For the skin of the finger is connected by a bundle of fine nervous fibres, which run up the whole length of the arm, with the spinal marrow and brain, and we know that the feeling of pain caused by the prick of a pin is dependent on the integrity of those fibres. If they be cut through close to the spinal cord, no pain will be felt, whatever injury is done to the finger; and, if the ends which remain in connection with the cord be pricked, the pain which arises will appear to have its seat in the finger just as distinctly as before. Nay, if the whole arm be cut off, the pain which arises from pricking the nerve-stump will appear to be seated in the fingers, just as if they were still connected with the body.

"It is perfectly obvious, therefore, that the localization of the pain at the surface of the body is an act of the mind. It is an *extradition* of that consciousness, which has its seat in the brain, to a definite point of the body—which takes place without our volition, and may give rise to ideas which are contrary to fact. We might call this extradition of consciousness a reflex feeling, just as we speak of a movement, which is excited apart from, or contrary to, our volition, as a reflex motion. Locality is no more in the pin than pain is; of the former, as of the latter, it is true that 'its being is to be perceived,' and that its existence apart from a thinking mind is not conceivable.

"The foregoing reasoning will be in no way affected, if, instead of pricking the finger, the point of the pin rests gently against it, so as to give rise merely to a tactile sensation. The tactile sensation is referred outward to the point touched, and seems to exist there. But it is certain that it is not and cannot be there really, because the brain is the sole seat of consciousness; and further, because evidence, as strong as that in favor of the sensation being in the finger, can be

brought forward in support of propositions which are manifestly absurd.

“ For example, the hairs and nails are utterly devoid of sensibility, as every one knows. Nevertheless, if the ends of the nails or hairs are touched, ever so lightly, we feel that they are touched, and the sensation seems to be situated in the nails or hairs. Nay, more, if a walking-stick a yard long is held firmly by the handle and the other end is touched, the tactile sensation, which is a state of our own consciousness, is unhesitatingly referred to the end of the stick ; and yet no one will say that it *is* there.

“ Let us now suppose that, instead of one pin’s point resting against the end of my finger, there are two. Each of these can be known to me, as we have seen, only as a state of a thinking mind, referred outward, or localized. But the existence of these two states, somehow or other, generates in my mind a host of new ideas, which did not make their appearance when only one state was present.

“ For example, I get the ideas of coexistence, of number, of distance, and of relative place or direction. But all these ideas are ideas of relations, and imply the existence of something which perceives those relations. If a tactile sensation is a state of the mind, and if the localization of that sensation is an act of the mind, how is it conceivable that a relation between two localized sensations should exist apart from the mind ? It is, I confess, quite as easy for me to imagine that redness may exist apart from a visual sense, as it is to suppose that coexistence, number, and distance can have any existence apart from the mind of which they are ideas.

“ Thus, it seems clear that the existence of some, at any rate, of Locke’s primary qualities of matter, such as number and distance, apart from mind, is as utterly unthinkable as the existence of color and sound, under like circumstances.

“ Will the others, namely, figure, motion and rest, and solidity, withstand a similar criticism ? I think not. For all these, like the foregoing, are perceptions by the mind of the relations of two or more sensations to one another. If the distance and place are inconceivable, in the absence of the mind of which they are ideas, the independent existence of figure, which is

the limitation of distance, and of motion, which is change of place, must be equally inconceivable. Solidity requires more particular consideration, as it is a term applied to two very different things, the one of which is solidity of form, or geometrical solidity; while the other is solidity of substance, or mechanical solidity.

"If those motor nerves of a man, by which volitions are converted into motion, were all paralyzed, and if sensation remained only in the palm of his hand (which is a conceivable case), he would still be able to attain to clear notions of extension, figure, number, and motion, by attending to the states of consciousness which might be aroused by the contact of bodies with the sensory surface of the palm. But it does not appear that such a person could arrive at any conception of geometrical solidity. For that which does not come in contact with the sensory surface is non-existent for the sense of touch, and a solid body, impressed upon the palm of the hand, gives rise only to the notion of the extension of that particular part of the body which is in contact with the skin.

"Nor is it possible that the idea of outness (in the sense of discontinuity with the sentient body) could be attained by such a person, for, as we have seen, every tactile sensation is referred to a point either of the natural sensory surface itself, or of some solid in continuity with that surface. Hence, it would appear that the conception of the difference between the ego and the non-ego could not be attained by a man thus situated. His feelings would be his universe, and his tactile sensations his *mænia mundi*. Time would exist for him as for us, but space would have only two dimensions.

"But now remove the paralysis from the motor apparatus, and give the palm of the hand of our imaginary hand perfect freedom to move, so as to be able to glide in all directions over the bodies with which it is in contact. Then, with the consciousness of that mobility, the notion of space of three dimensions—which is *Raum*, or "room," to move with perfect freedom—is at once given. But the notion that the tactile surface itself moves cannot be given by touch alone, which is competent to testify only to the fact of change of place—not to its cause. The idea of the notion of the tactile surface

not, in fact, be attained, unless the idea of change of were accompanied by some state of consciousness, which not exist when the tactile surface is immovable. This of consciousness is what is termed the muscular sense, as existence is very easily demonstrable.

Suppose the back of my hand to rest upon a table, and a sign to rest upon the upturned palm. I at once acquire an idea of extension, and of the limit of that extension. The impression made by the circular piece of gold is quite different from that which would be made by a triangular or a square of the same size, and thereby I arrive at the notion of extension. Moreover, if the sovereign slides over the palm, I receive a distinct conception of change of place and motion, and of the direction of that motion. For, as the sovereign moves, it affects new nerve-endings, and gives rise to new sensations of consciousness. Each of them is definitely and separately localized by a reflex act of the mind, which, at the same time, becomes aware of the difference between two successive localizations; and therefore, of change of place, which is motion.

If, while the sovereign lies on the hand, the latter being quite steady, the forearm is gradually and slowly raised, the tactile sensations, with all their accompaniments, remain the same as they were; but, at the same time, something new is introduced, namely, the sense of effort. If I try to discover the cause of this sense of effort seems to be, I find myself rather puzzled at first; but, if I hold the forearm in position long enough, I become aware of an obscure sense of fatigue, which is apparently seated, either in the muscles of the arm, or in the integument directly over them. The fatigue seems to be added to the sense of effort, in much the same way as the pain which supervenes upon the original sense of contact, when a pin is slowly pressed against the skin, is related to it.

A little attention will show that this sense of effort accompanies every muscular contraction, by which the limbs, or parts of the body, are moved. By its agency the fact of movement is known, while the direction of the motion is given by the accompanying tactile sensations. And, in

consequence of the incessant association of the muscular and the tactile sensations, they become so fused together, that they are often confounded under the same name.

"If freedom to move in all directions is the very essence of that conception of space of three dimensions, which we obtain by the sense of touch; and if that freedom to move is really another name for the feeling of unopposed effort, accompanied by that of change of place; it is surely impossible to conceive of such space as having existence apart from that which is conscious of effort!

"But it may be said that we derive our conception of space of three dimensions not only from touch, but from vision; that if we do not feel things actually outside us, at any rate we see them. And it was exactly this difficulty which presented itself to Berkeley at the outset of his speculations. He met it with characteristic boldness, by denying that we do see things outside us; and, with no less characteristic ingenuity, by devising that 'New Theory of Vision,' which has met with wider acceptance than any of his views, though it has been the subject of continual controversies."

Passing over more than three pages of the printed lecture, we come to the following observations on the bishop's "Essay toward a New Theory of Vision:—"

"When due allowance is made for the occasional looseness and ambiguity of Berkeley's terminology, and the accessories are weeded out of the essential parts of his famous essay, his views may, I believe, be fairly and accurately summed up in the following propositions:

"1. The sense of touch gives rise to ideas of extension, figure, magnitude, and motion.

"2. The sense of touch gives rise to the idea of 'outness' in the sense of localization.

"3. The sense of touch gives rise to the idea of resistance, and thence to that of solidity, in the sense of impenetrability.

"4. The sense of touch gives rise to the idea of 'outness' in the sense of distance in the third dimension, and thence to that of space, or geometrical solidity.

"5. The sense of sight gives rise to ideas of extension of figure, magnitude, and motion.

'6. The sense of sight does not give rise to the idea of 'ness' in the sense of distance in the third dimension, nor that of geometrical solidity, no visual idea appearing to be without the mind, or at any distance off (§§ 43, 50).

'7. The sense of sight does not give rise to the idea of mechanical solidity.

'8. There is no likeness whatever between the tactile ideas, and extension, figure, magnitude, and motion, and the visual ideas which go by the same names; nor are any ideas common to the two senses.

'9. When we think we see objects at a distance, what really happens is, that the visual picture suggests that the object seen has tangible distance; we confound the strong idea of the tangible distance of the object with actual sight at a distance.

'10. Visual ideas, therefore, constitute a kind of language, by which we are informed of the tactile ideas which will or may arise in us.

'Taking these propositions into consideration *seriatim*, it may be assumed that every one will assent to the first and second; and that, for the third and fourth, we have only to add the muscular sense under the name and sense of touch, as Berkeley did, in order to make it quite accurate. Nor is it intelligible to me that any one should explicitly deny the truth of the fifth proposition, though some of Berkeley's supporters, less careful than himself, have done so. Indeed, it must be confessed that it is only grudgingly, and, as it were, against will, that Berkeley admits that we obtain ideas of extension, figure, and magnitude, by pure vision, and that he more than half retracts the admission; while he absolutely denies that sight gives us any notion of outness, in either sense of the word, and even declares that 'no proper visual idea appears without the mind, or at any distance off.' By 'proper visual ideas,' Berkeley denotes colors, and light, and shade; therefore he affirms that colors do not appear to be at any distance from us. I confess that this assertion appears to me to be utterly unaccountable. I have made endless experiments on this point, and by no effort of the imagination can I persuade myself, when looking at a color, that the color is in

my mind, and not at a 'distance off,' though, of course, know perfectly well, as a matter of reason, that color is subjective. It is like looking at the sun setting, and trying to persuade one's self that the earth appears to move, and not the sun—a feat I have never been able to accomplish. Even when the eyes are shut, the darkness of which one is conscious carries with it the notion of outness. One looks, so to speak, into a dark space. Common language expresses the common experience of mankind in this matter. A man will say that a smell is in his nose, a taste in his mouth, a singing in his ears, a creeping or a warmth in his skin; but, if he is jaundiced, he does not say that he has yellow in his eyes, but that every thing looks yellow; and, if he is troubled with *muscæ volitantes*, he says, not that he has specks in his eyes, but that he sees specks dancing before his eyes. In fact, it appears to me that it is the special peculiarity of visual sensations, that they invariably give rise to the idea of remoteness, and that Berkeley's dictum ought to be reversed. For I think that any one, who interrogates his consciousness carefully, will find that 'every proper visual idea' appears to be without the mind, and at a distance off.

"Not only does every *visibile* appear to be remote, but it has a position in external space, just as *tangibile* appears to be superficial and to have a determinate position on the surface of the body. Every *visibile*, in fact, appears (approximately) to be situated upon a line drawn from it to the point of the retina on which its image falls. It is referred outward, in the general direction of the pencil of light by which it is rendered visible; just as, in the experiment with the stick, the *tangibile* is referred outward to the end of the stick.

"It is for this reason that an object, viewed with double eyes, is seen single and not double. Two distinct images are formed, but each image is referred to that point at which the two optic axes intersect; consequently the two images exactly cover one another, and appear as completely one as any other two exactly similar superimposed images would be. And it is for the same reason that, if the ball of the eye is pressed upon at any point, a spot of light appears apparently outside the eye, and in a region exactly opposite to that in which the pressure is made.

"But while it seems to me that there is no reason to doubt that the extradition of sensation is more complete in the case of the eye than in that of the skin, and that corporeal distinctness, and hence space, are directly suggested by vision, it is rather, and a much more difficult question, whether the notion of geometrical solidity is attainable by pure vision; that is to say, by a single eye, all the parts of which are immovable. However this may be for an absolutely fixed eye, I perceive there can be no doubt in the case of an eye that is movable and capable of adjustment. For, with the movable eye the muscular sense comes into play in exactly the same way as in the movable hand, and the notion of change of position, *plus* the sense of effort, gives rise to a conception of three-dimensional space, which runs exactly parallel with that of tangible objects. When two movable eyes are present, the notion of three dimensions is obtained in the same way as it is with the two hands, but with much greater precision.

"And if, to take a case similar to one already assumed, we suppose a man deprived of every sense except vision, and of every notion except that of his eyes, it surely cannot be doubted that he would have a perfect conception of space, and indeed a much more perfect conception than he who possessed touch alone without vision. But of course our touchless man would be devoid of any notion of resistance; and hence space, for him, would be altogether geometrical and devoid of body."

Prof. Huxley agrees with Berkeley in his eighth proposition in so far as that there is no likeness between the ideas given by sight and those given by touch, if the term "ideas" is restricted to mere sensations; but, when he goes further than this, and declares that there are no "ideas" common to the ideas of touch and those of sight, the professor conceives that he has fallen into a great error, and one that is the chief vice of his paradoxes about geometry. I have not space to set out his arguments on this point, and must content myself with remarking that he demolishes the ninth proposition and replaces it in the following terms: "Vision combined with the muscular sensations, produced by the movement of eyes, gives us as complete a notion of corporeal separation and of distance in the third dimension of space, as touch com-

bined with the muscular sensations produced by the movements of the hand does."

"The tenth proposition seems to contain a perfectly true statement, but it is only half the truth. It is no doubt true that our visual ideas are a kind of language by which we are informed of the tactile ideas which may or will arise in us; but this is true, more or less, of every sense in regard to every other. If I put my hand in my pocket, the tactile ideas which I receive prophesy quite accurately what I shall see—whether a bunch of keys or half-a-crown—when I pull it out again; and the tactile ideas are, in this case, the language which informs me of the visual ideas which will arise. So with the other senses: olfactory ideas tell me I shall find the tactile and visual phenomena called violets, if I look for them; taste tells me that what I am tasting will, if I look at it, have the form of a clove; and hearing warns me of what I shall or may see and touch every minute of my life.

"But while the 'New Theory of Vision' cannot be considered to possess much value in relation to the immediate object its author had in view, it had a vastly important influence in directing attention to the real complexity of many of those phenomena of sensation which appear at first to be simple. And even if Berkeley was, as I imagine he was, quite wrong in supposing that we do not see space, the contrary doctrine makes quite as strongly for his general view, that space can be conceived only as something thought by a mind."

"To sum up: If the materialist affirms that the universe and all its phenomena are resolvable into matter and motion, Berkeley replies, 'True; but what you call matter and motion are known to us only as forms of consciousness; their being is to be conceived or known; and the existence of a state of consciousness, apart from a thinking mind, is a contradiction in terms.'

"I conceive that this reasoning is irrefragable. And therefore, if I were obliged to choose between absolute materialism and absolute idealism, I should feel compelled to accept the latter alternative. And, indeed, upon this point Locke does, practically, go as far in the direction of idealism as Berkeley, when he admits that 'the simple ideas we receive from sen-

ation and reflection are the boundaries of our thoughts, beyond which the mind, whatever efforts it would make, is not able to advance one jot.' ”

Dr. Burden Sanderson, Professor of Practical Physiology in University College, is delivering a very remarkable course of lectures on Experimental Physiology, which are being published in the *Medical Times*. The first six lectures are devoted to the blood and to cell-life generally, and to the knowledge we acquire from the sphygmograph, an instrument to which he has devoted much attention; in his seventh lecture, however, he takes up a subject which falls within the scope of these letters, and has many important practical bearings in relation to the phenomena of disease, particularly those of fever, inflammation, and collapse, namely, *vascular innervation*. “The arteries,” he observes, “owe their contractility to the unstriated muscular fibres which they contain. These fibres contract under the influence of impressions conveyed to them by the vascular nerves, which nerves, together with the automatic centre from which they radiate, constitute the *vaso-motor nervous system*.”

“Of the centre which governs arterial contraction we know nothing anatomically. In other words, there is no point in the brain or spinal cord to which the vascular nerves can be traced back.

“That there is a vaso-motor centre, and that it is situated in the encéphalon, we learn by observing—first, that if the spinal cord is divided immediately below the medulla oblongata, all the arteries are dilated; and, secondly, that if we excite certain afferent nervous fibres which lead to the medulla oblongata, we can produce a similar effect, though in considerably less degree. Thus we learn, on the one hand, that the arterial muscles cease to act when the communication between them and the encephalon is severed, even though the rest of the nervous system remains entire; and, on the other, that their action can be modified by exciting a *cranial* nerve—i. e., by an agency which can only reach them through the medulla oblongata.

“That the vaso-motor centre is in constant automatic action is shown by the paralyzing effect of section, whether of the

spinal cord or of any nerve known to contain vascular fibres. If the action of the centre were not constant, division could not produce arterial relaxation. In relation to this constancy of action, we use the word *tonus*. Arterial tonus means that degree of contraction of an artery which is constant and normal. It is maintained only so long as the artery is in connection with the vaso-motor centre.

"The channels of communication between the centre and the arteries are partly spinal, partly sympathetic. That they are spinal is shown by the fact that stimulating the spinal cord, in any part of its extent, produces arterial contraction in corresponding regions of the body. That they are also sympathetic is shown by the effect of dividing various nerves belonging to the sympathetic system, in producing vascular paralysis of the parts to which they are respectively distributed. The vascular nerves of the integument of the head were shown by Bernard, long before the general arrangement of the vaso-motor nervous system was known to be included in the cervical portion of the gangliated cord. More recently we have learned that the vascular nerves of the extremities, although springing from the sympathetic trunk, ultimately originate from the anterior spinal roots, and that the abdominal viscera receive their supply from the splanchnics.

"In the present lecture I will confine myself to the simpler phenomena of vascular contraction and dilatation. I will show that stimulation of a vaso-motor nerve produces contraction of the arteries to which it is distributed; and section, paralysis; that, just as section and stimulation of an ordinary motor nerve paralyze or stimulate its muscle, excitation of the spinal cord produces vascular narrowing, and hereby increased resistance to the circulation blood, and increased arterial pressure; that, when sensory nerves are excited, two effects are produced of an opposite nature, which mutually modify each other: reflex dilatation of the arteries which supply blood to the region to which the nerves are distributed, but increased arterial tonus in other parts of the body."

He then proceeds to notice the immense progress that has been made since 1860 in our knowledge of the functions of the vascular nerves, and describes briefly the researches of the late

Von Bezold on the nervous system of the heart, which were published in 1863. Among a number of other less important discoveries, he showed for the first time the nature and extent of the influence exercised by the brain and spinal cord on the circulation of the blood. He found that when in a curarized rabbit or dog the spinal cord is severed from the brain, the arterial pressure sinks very considerably, while at the same time the number and extent of the contractions of the heart are diminished; and that if, on the other hand, the upper end of the divided spinal cord is irritated below the point of section, the arterial pressure rises to its original level, and the heart to its previous activity. As in this experiment the changes of arterial pressure follow the excitation of the spinal cord directly, there is not the slightest doubt that the result is to be attributed in the one case to increased contraction, in the other to relaxation of the muscular fibres in the walls of the great system of tubes in which the blood is contained; but it was not shown by Von Bezold whether the muscular fibres affected were those of the heart or those of the arteries. Bezold, indeed, himself believed that the diminution of arterial pressure after section of the cord was mainly due to the relaxation of the heart.

This question was determined by a set of experiments performed on various animals, especially rabbits and frogs, by Ludwig and Threny conjointly, which clearly established the following facts: first, that if, in animals in which the cord has been severed from the medulla oblongata, the state of the arteries is observed before, after, and during electrical excitation of the upper end of the severed cord, it is seen that they contract; and, secondly, that if all of the nervous communications between the cerebro-spinal centres and the heart are divided, and if the effects of stimulating the cord observed before and after this operation are compared, it is seen that there is, *so far as relates to pressure*, no material difference in the effect on the circulation produced in the two cases, and consequently that the whole of it is arterial.

For the method of performing the experiments referred to, my readers must consult the original lecture; and I proceed to the professor's remarks on the proof that certain nerves known

to contain vascular filaments are really vaso-motor. The most important vaso-motor nerves are the cervical sympathetic trunk and the splanchnic nerves. With reference to each of these, it is possible to show experimentally that section paralyzes the arteries to which it is distributed; and that stimulation of the cut end, which is still in connection with the periphery, determines their contraction. In the case of the cervical sympathetic, the demonstration is extremely simple.

For details regarding the method of performing the experiment on a chloralized rabbit I must refer to the lecture. The professor observes that "the same animal, still under the influence of chloral, will serve to illustrate the fact which stands next in importance to those relating to the direct effects of section and excitation of a vaso-motor nerve, namely, the reflex effects of electrical excitation of sensory nerves. When the experiment is made, as it was first made by Lovén, on a curarized animal, two distinct, and indeed antagonistic, modes of action manifest themselves, first a general action, which gives rise to an increased arterial pressure; and, secondly, a local action, showing itself in vascular congestion of the region to which the irritated sensory nerves are distributed. The increased arterial pressure is due, not to any increase in the vigor with which the heart contracts, but to general narrowing of the arteries, and consequent increased resistance. The local congestion results from what has been called a reflex paralysis, a paralysis *really* quite as complete as that produced by section of the sympathetic, and, in the non-chloralized animal, *apparently* more so; for, in consequence of the general increase of arterial tension, the relaxed arteries give way, and enlarge more than they do when the vaso-motor nerves are divided."

For this experiment we take the vessels of the ear, on the side not previously operated on. The ear of the rabbit derives its sensibility from two nerves, the posterior auricular, and the great auricular, both of which contain fibres, which are in reflex relation with the vaso-motor system; and, if we fail in obtaining the desired result by exciting one, we should at once try the other nervous trunk. For the mode of experimentation I must refer to the lecture.

What is the nature of this reflex paralysis? "It signifies," says the professor, "that the vaso-motor centre, which is always in a state of activity, has its action suspended, or, as some prefer to call it, inhibited, so far as relates to the vaso-motor nerves of the region over which the effect extends.

"When the experiment is made as Lovén himself made it, in an animal paralyzed with curare, the effect is more complicated than it is in a chloralized animal, for two kinds of effect are produced. There is, so to speak, a struggle between two opposite conditions—vascular spasm and vascular paralysis—relaxation in the region of the excited sensory nerve, contraction in all other parts of the body, the degree of which can be easily judged of by the inspection of such arteries as can be exposed, just as in Thiry's experiment.

"The meaning of this antagonism is, that in the chloralized animal the influence of the cerebral hemispheres is suspended, whereas under curare they are still active. The irritation of those centripetal fibres which are concerned in the sensation of pain exercises an influence on the vaso-motor centre, which is opposed to that of the fibres, which enter it directly from sensory nerves; in other words, the vaso-motor centre receives impressions, when a sensory nerve is irritated, of two kinds: impressions which are conveyed directly, and others which reach it through the cerebral hemispheres, the former diminishing or inhibiting its action on the vessels, the latter adding to or augmenting that action. In the curarized animal the arteries all over the body contract, because the pain is in action. When the hemispheres are paralyzed, no such effect is produced."

The professor doubtless observes that the same rabbit will serve for both experiments, in consequence of his having been most unjustly charged in the *Pall Mall Gazette* with unnecessary cruelty in his experiments.

Dr. Brunton has published some interesting facts on the "Influence of Nerves on Blood-Pressure," in the *British Medical Journal*. Both the quickness of the heart's beat and the contraction of the arteries are regulated by the nervous system; and it is generally by acting on different parts of it that drugs alter the blood-pressure, though they may also do

so by acting on the muscular walls of the heart and arteries themselves. The parts of the nervous system chiefly concerned in regulating the circulation are :

I. The *cardiac ganglia*, which lie in the walls of the heart, and are, in all probability, the cause of its rhythmical action.

II. *Inhibitory nerves*, which render the heart's action slow, and, if irritated very strongly, may stop its beating altogether, and produce still-stand in *diastole*. The inhibitory fibres have their origin or roots in the medulla, and proceed in the vagi to the heart. In man and in dogs paralyzed the heart beats three or four times as quickly as before. In rabbits and cats they act less, and their division only makes the heart go one-half or one-fourth faster. A drug may irritate them, and render the heart's action slow :

1. By acting *directly* on *a*, their roots in the medulla; *b*, their fibres; *c*, their ends in the heart.

2. Indirectly, through its action on other parts, producing *a*, increased blood-pressure; or, *b*, accumulation of carbonic acid in the blood, both of which act as irritants to the vagus roots.

3. Reflexly, through irritation of sensory nerves, irritation of the intestines of the sympathetic nerve, of the depressor, or of the vagus of the other side. Reflex irritation is only likely to be caused by drugs having a powerful local action.

Drugs may also paralyze the inhibitory fibres, and thus quicken the heart.

III. *Quickening Nerves*.—These belong to the sympathetic system. They have their origin in the brain or medulla, pass down through the cervical part of the spinal cord to the last cervical and first dorsal ganglion (which are often united), and thence through the third branch of the ganglion to the heart. Quickening fibres are said by some to run also in the cervical part of the sympathetic cord. Unlike the vagus, the quickening nerves are not normally in constant action.

They may be irritated :

1. By the direct action of drugs upon them.

2. Indirectly by the drugs producing a diminished blood-pressure, which acts as a stimulus to them.

IV. *Vaso-motor nerves*, which cause the smaller arteries, and probably also the capillaries, to contract. These belong to the sympathetic system; and the most important of them are the splanchnics, which produce contraction of the intestinal vessels. As these vessels can, under certain circumstances, hold all the blood in the body, the influence of the splanchnics over the blood-pressure is very great; and division of these can lower it, or stimulation of them increase it very much. The centre of the whole vaso-motor system, however, seems to be in the medulla oblongata; and it is generally in constant action, keeping up a certain amount of contraction or tone in these vessels.

Its activity may be increased, and the vessels made to contract:

1. By direct irritation of the centre.
2. By reflex irritation through (a) the cervical sympathetic; (b) the vagus, when the brain is intact, and the animal not narcotized; (c) sensory nerves. When the medulla is separated from the rest of the body by dividing the spinal cord at the atlas, it can, of course, no longer exert any influence over the vessels; and they consequently become dilated throughout the whole body, and the blood-pressure sinks very low. If the lower end of the divided cord be then irritated, the vaso-motor nerves which pass through it from the medulla to the body are stimulated and the blood-pressure rises.

V. *Vaso-inhibitory Nerves*.—Irritation of these nerves is conducted by the vaso-motor centres, and acts on them in such a way as to cause a reflex dilatation of the small vessels, either (1) throughout the whole body, or (2) in one particular part of it:

1. The chief nerve which causes dilatation throughout the whole body is one which runs from the heart to the medulla, and is called, from its power of diminishing blood-pressure, the depressor nerve. Its fibres seem to be included in the vagus in the dog; but in the rabbit it generally runs separate from the heart to the level of the thyroid cartilage; here it divides into two so-called roots, one root going to the superior laryngeal, and the other to the vagus nerve. These are generally called roots, though, as the nerve conveys impres-

sion *from* the heart to the brain, they are, physiologically, really branches. There seem to be also depressor fibres in the vagus itself; but this nerve contains fibres of many kinds, and, among others, some which cause contraction of the vessels and rise of blood-pressure—hence called pressor fibres. The former seem to act on the vaso-motor system through the medulla itself, while the latter affect it through a centre in the brain, so that, when the brain is perfect, irritation of the central end of the vagus causes increased contraction of the vessels and raised blood-pressure; but, when the brain is removed or its functions abolished by opium, it causes dilatation of vessels and diminished pressure.

2. When a sensory nerve is irritated, the action of the vaso-motor centre is suspended in the part supplied by the nerve, and in those which immediately adjoin it, so that their vessels become dilated, while at the same time contraction of the vessels in other parts of the body is produced. The blood-pressure is thus increased generally, and produces in the locally-dilated vessels a very rapid stream of blood. This fact was first discovered, and its importance in therapeutics indicated, by Ludwig and Lovén.

A very able reviewer of Dr. Radcliffe's "Dynamics of Nerve and Muscle" (in which his latest and most matured views are propounded) sums up his theory as follows: "He compares the sheath of a muscular fibre to a band of India-rubber, coated on its two surfaces, within a short distance from the edge, with gold leaf, so as to allow of its being charged and discharged in turn, like a Leyden jar. On charging and discharging such a band, it is found that the charge is accompanied by elongation, and the discharge by contraction. He supposes, therefore, that the sheaths of the muscular fibres are dielectric; that their outer surfaces may become electrically charged; that an opposite charge may be induced on their inner surfaces; that the mutual attraction of these two charges causes transverse compressions of the sheath, and so elongation or relaxation of the fibre; and that contraction of the fibre is simply the elastic recoil of the sheath when the opposite charges cease."

"Before this theory can have any claim to serious consideration," the reviewer observes, "we may ask for proof, or at

least for some indication that the following assumptions are fairly probable: (1) That the sheaths of muscular fibres are actually elastic; (2) That they are bad conductors; (3) That on their exterior surfaces there is some comparatively good conducting material capable of being rapidly charged; (4) That the contents of the fibres are comparatively good conductors throughout their lengths; and (5) That these contents may be at one time uninsulated to admit of their charge by induction, and at another time be put rapidly into electric communication with the supposed oppositely-charged, exterior-conducting surfaces of the fibres."

"Among these assumptions the only one that is discussed by Dr. Radcliffe is the second, and in evidence he adduces experiments showing that nerve and muscle and certain other tissues are very imperfect conductors. In three experiments in which measurement was made of the resistances of similar pieces of the sciatic nerve, the *tendo achillis* and the *adductor longus* of a recently-killed rabbit, there were found to be, in the nerve, 40,000 units; in the tendon, 38,000; and in the muscle, 12,000. It is obvious that, if this affords some justification for assumption 2, it is completely subversive of 3 and 4."

Dr. Lauder Lindsay, of Perth, who published an excellent paper on "The Physiology of Mind in the Lower Animals," in the April number of the *Journal of Mental Science*, continues his investigation in an elaborate memoir on "Insanity in the Lower Animals," in the July number of the *British and Foreign Medico-Chirurgical Review*, and in an essay on "Madness in Animals," in the last number of the former journal.

He tells us that for the last three years he has been engaged in studying the *disorders of the mind in the lower animals*, and in the article on "Insanity in the Lower Animals" he discusses those *mental* or cerebral functional disorders in the lower animals that are comparable with, or analogous to, the group of affections embraced in the category of *insanity in man*.

The kind and amount of evidence he has collected is sufficient to convince him that—

1. Certain of the lower animals possess *mind of the same nature as that of man*.

2. There is therefore *no essential mental distinction* between man and other animals.

3. Many of the same influences that are the *causes* of insanity in man operate, frequently in the same way, and to the same degree, on the mind of animals.

4. Man and other animals are alike subject to *other diseases*, including especially those of the brain and general nervous system.

5. The same sudden and marked *changes of character or disposition*, that in man so usually constitute the *prodromata* of insanity, occur equally in animals.

6. In animals, as in man, there is *hereditary transmission* of predispositions to disease, of qualities acquired by education, of deformities accidentally produced, of morbid lesions artificially created.

7. The diseases common to man and other animals are frequently, at least, due to *similar causes*.

8. The lower animals are liable to the *same kind of mental disorders* as man.

9. In comparing the mental or other diseases of animals with those of man, due allowance must be made for *ordinal, generic, and specific*—for anatomical, physiological, and therefore, also, pathological *differences*, as well as for *individual idiosyncrasies* or predispositions.

All that he maintains in the present paper is that *proof* will probably be obtained, when it is properly looked for, that man and certain other animals are subject *in common* to various forms of *mental disorder*. From veterinary surgeons, to whom he naturally looked for information, he got no assistance, except from Prof. Gaungee, who admits that "*much* could be said on the subject of *morbid mental* conditions in animals," but that, in short, "*the history of nervous diseases in the lower animals has yet to be written*;" and he goes on to explain, in relation to morbid mental conditions: "The ferocity suddenly manifested by animals which early in life have been very docile, the extreme irritability of some, and the apparently gross stupidity and listlessness of others,

en indicate deviations from the normal state of either *instinctive* or *reasoning* faculties. There are singular instances of animals acquiring peculiar morbid tastes, which can only be explained as due to nervous disease; and there can be no doubt that, just as we find the greatest diversity in the amount of intelligence possessed by different individuals of the same species, so may we have perversions of *instinct* or *intellect* similar to those which are manifested by the human idiot or lunatic." Although there is much that is erroneous in the preceding quotation, it is clear that it had occurred to Prof. Gamgee to compare certain *morbid mental* phenomena in the domestic animals with some of the forms of human *madness*. Among his professional brethren, Dr. John Brown, Edinburgh (the well-known author of "Rab and his friends," etc.), is almost the only supporter of his convictions on this point, that Dr. Lindsey has met with. Dr. Brown writes of him as follows: "Surely if animals have will, and thought, and affections, they may in their modes, or functions, or organs, be *disordered* and *deranged*, as truly as poor humans."

After studying the definitions of mind, and the classification of the mental faculties given by the highest authorities, he finds "the *phrenological* classification of the mental faculties a much more convenient standard than any of the more modern classifications of psychologists, the more especially so inasmuch that the phrenologists distinguished themselves by their advanced, enlightened, and liberal opinions in recognizing *intellectual power in animals*, and in comparing this power, at least in health, with the human mind. In George Combe's system of Phrenology, there is a section on *comparative psychology*, which is equivalent, so far, to the modern *comparative psychology*, but which scarcely includes *comparative psycho-pathology*. According to phrenologists, animals possess *all the mental faculties of man*, whether (1) *affective*, or *intellectual*. Thus, they possess the following:

"I. *Perceptive Faculties*.—Individuality, weight (resistance), locality, order, eventuality, form, size, time, tune (musical talent), number, and language.

"II. *Reflective Faculties*.—Comparison, causality.

"III. *Propensities*.—Secretiveness, destructiveness, philoprogenitiveness, alimentiveness, combativeness, inhabitiveness, concentrativeness, adhesiveness, amativeness, acquisitiveness, and constructiveness.

"IV. *Lower Sentiments* (common to man and the lower animals).—Self-esteem, love of approbation, and cautiousness.

"While believing, with the phrenologists, that certain of the lower animals exhibit, in some degree, *all* of these mental phenomena or attributes, there are *some* of the so-called faculties whose existence in animals is capable of more ready and abundant evidence than others, while the occurrence of a few is so obvious as to require no comment.

"The phrenologists recognize, however, a group of

"V. *Superior Sentiments peculiar to Man*—the so-called *moral sentiments*—which include—

"Benevolence, veneration, firmness (perseverance), conscientiousness, hope, wonder, ideality, wit (mirthfulness), and imitation."

It is, he believes, a decided error to suppose that these faculties are not possessed by animals. There is quite as much and as good evidence in support of the belief that they exhibit these *higher* sentiments as that they possess the *lower* ones, or the propensities that are generally but most erroneously denominated, if distinctiveness is pointed at, *animal*. There is good ground for believing that certain of the domestic animals possess what is known as "*the moral sense*," or "the feeling of moral obligation" in man. They can be at least trained to a knowledge of *right and wrong*, and to an intelligent comprehension of *praise and blame* for well or evil doing, and of the principle of *rewards and punishments* therefor. There is abundant proof of their also possessing *benevolence* and generosity, solicitude for, compassion or sympathy with, human joys and sorrows, as well as with those of their own kin or species; and there can be no doubt as to their powers of *imitation*. There are therefore *moral*, and there are also *immoral*, qualities in animals; there are both good and bad features in their "characters" or "dispositions," using all these terms in the popular sense in which they are generally applied to man. Their bad qualities include, for

instance, anger, hatred or antipathy, quarrelsomeness, bad temper, retaliation, revenge, vindictiveness, or the resentment of jury, unforgiveness, petulance, impatience, mischievousness, self, cowardice, ferocity, viciousness, moroseness, intractableness, selfishness, obstinacy or stubbornness, spitefulness, sullenness or surliness, cruelty, tyranny, laziness. It will suffice, rather, to illustrate at once the comprehensiveness of the animal mind, and its similarity to that of man, to mention that certain of the domestic animals are capable of exhibiting wonderful degree of self-command; *amour propre*; a keen sensibility to ridicule, affront, insult; a sense of shame, discomfiture, defeat, disgrace, detection in wrong-doing; agony, stress, remorse, misery, unhappiness, annoyance, uneasiness; emulation, sometimes amounting to fierce contests for supremacy; eagerness, impetuosity, ardor, vehemence, personal rivalry; apprehension, fear; pleasures and pains, joy and sorrow, excitement and depression.

The chief *causes of insanity* in man, as laid down in one of our latest text-books on the subject (Bucknill and Tuke's *Manual of Psychological Medicine*, 1858, p. 241), are as follows:

"I. *Predisposing*.—Heredity, sex, age, season, town and country life, occupation.

"II. *Exciting*.—*a. Moral*: disappointed affections, domestic troubles, wounded feelings, fright or fear, grief, anxiety, or jealousy. *b. Physical*: general ill-health, specific injuries or diseases (e. g., epilepsy and uterine derangement), pregnancy."

There are very few of these causes or influences that do not, in some measure, operate also in the case of animals, while some of them operate in much larger measure. Certain causes may be held peculiar to man, for instance religious excitement and intemperance; but, on the other hand, there may be some that are peculiar to other animals. In his paper on "The Causes of Insanity in Arctic Regions," published last year, he shows that certain of the same influences, especially the length and darkness of the winter, that injuriously affect the mind of man, equally affect that of the dog.

In his remarks on the *hereditary transmissibility* of peculiarities in the lower animals he remarks that, although the sub-

ject has not yet been duly studied, there are various cases on record, as for example the hereditary transmission of artificially-produced epilepsy in guinea-pigs, the dry gangrene of the ear in these animals, etc.

That the effect of *domestication* and *breeding* is productive of a *predisposition* to disorders of the nervous system, is another point treated of by our author in relation to the *etiology of insanity in animals*. High breeding in dogs and horses begets extreme nervous susceptibility, including *high mental sensitiveness*; one result whereof is great susceptibility to disorders of the nervous system, precisely analogous to the effect of high civilization in man. Claude Bernard has found that dogs and horses of high breeds are unfit for his experiments, a very slight operation bringing on fever, and causing various alarming symptoms.

On the assumption that insanity consists in or emanates from *perverted emotion*, Dr. Lindsay proceeds to show that many of the lower animals, especially when domesticated, are *eminently emotional*. He refers to various cases of dogs, horses, elephants, and birds that became melancholy or even died from grief at the loss of old companions; to the exhibition of love, jealousy, and anxiety, in various animals; to the good or bad effects produced on their mind by the character (or, rather, the behavior) of their masters; to the influences of captivity, solitude, cold, alcohol, etc. Parrots have the character of being sadly fond of strong drinks, and are said to behave in a most absurd manner when intoxicated.

Having shown that the lower animals are subject to most of the influences which produce insanity in man, and that, like man, animals have their idiosyncrasies, he proceeds to illustrate his proposition that "certain of the lower animals, especially those which are domesticated, are subject to many of the *same diseases of the brain or nervous system* that are so common to man: and hence arises at least the probability that they are equally liable to those functional cerebral disorders that are productive of or constitute insanity in man." Among these diseases he places epilepsy, catalepsy, chorea, apoplexy, coma, convulsions, hysteria, meningitis, phrenitis (the head-staggers), paralysis, and delirium, while *post-mortem*

examinations reveal congestion, indurations, softening, atrophy and tumors of the brain, and hydrocephalus.

"Many of the lower animals exhibit the same sudden apparently causeless and marked *changes in disposition or habit* that constitute the *prodromata* of insanity in man. These phenomena include the development of perverted or depraved appetites, of alterations in the affections and temper, of remarkable change of the natural habits of the individual. It has been frequently noted that the horse, dog, ox, and other domestic animals become 'bad-tempered' or 'curious in their ways'—that they exhibit 'viciousness' or 'look wicked' prior to the development of various diseases of the brain or nervous system."

Eccentricities, not amounting to insanity, but comparable with those exhibited by man, are not uncommon in animals. Of these Dr. Lindsay gives numerous cases, which I have not space to quote. He then asks: "What is the so-called *madness* of animals as contradistinguished from *insanity* in man? How are both to be defined, if they are definable? To what extent or in what sense is *animal madness* synonymous with *human insanity*?"

Madness, as applied to animals, is usually supposed to refer to *rabies*, a specific contagious disorder, that is sometimes spontaneously developed in the dog, wolf, and other animals, and which is transmissible to animals of different species and to man, in whom it constitutes *hydrophobia*. Among the *prodromata* of *rabies* there is frequently a marked change in the affection, character, or habits, of the dog. In children suffering from *hydrophobia* similar symptoms have been observed; and they present "a condition of unrest, and of going hither and thither with simultaneous depression," just as is observed in dogs. "The disease known as *rabies* in animals and *hydrophobia* in man does not, however, belong to the category of *insanity*, which (though erroneously) is defined to be a disease *without fever*. But in so far as *mania* is 'a disorder of the *intellect*,' according to our latest nosology, there can be little doubt that *insanity* occurs equally in the *rabies* of animals and the *hydrophobia* of man; and, further, *mania* and other unquestionable 'disorders of the *intellect*' are developed in *many* mor-

bid conditions of the lower animals." In proof of this statement, he quotes the authority of Principal Williams, of the Edinburgh Veterinary College, who has seen many cases of *acute madness* from inflammation of the brain and its membranes, arising idiopathically, traumatically, or from *sympathy*, as in engorgement of the stomach. He has likewise seen *intermittent madness* from tumors on the brain, thickening of the membranes, abscesses, and once from softening of the cranial bones. In connection with the formation of abscesses, a horse under his care became, and for many years remained, an *idiot*. "He was called a '*crankey*' horse, but was harmless and did his work well enough." Prof. McBride, of the Royal Agricultural College, reports that he has seen cases of *frenzy* from blood-disorder or diseases of the digestive organs, and states that "there are certain forms of excitement, commonly called *vice*, which he firmly believes to be *insanity*, and which is often *hereditary*." Passing over several cases of animal madness collected from various sources, we come to his attempt to prove that the lower animals are subject to all the forms of insanity enumerated in the nosology of the College of Physicians.

Possibly he thinks general paralysis must be excepted, but he has a strong conviction that it will be found when it is duly searched for, and believes that it is at present confounded with and mistaken for a form of ordinary palsy, spinal or cerebro-spinal.

Evidence extending over many pages is then adduced to show that animals are liable to mania, melancholia, delusional insanity, amentia, and moral insanity; and thus brings to a close a very elaborate paper of nearly forty pages, which does not admit of easy analysis.

The main object of Dr. Lindsay's paper on "*Madness in Animals*," in the July number of the *Journal of Mental Science*, is to draw attention to what he believes "is an easily-provable fact, that *much, at least, of the so-called madness of the lower animals is strictly equivalent to what is called insanity in man.*"

With regard to *rabies* in animals, or *hydrophobia* in man, he observes that—

1. He believes both to be comparatively rare.
2. Hydrophobia in man is frequently, if not generally, the result of terror, ignorance, prejudice, or superstition, acting on a morbid *imagination* and a susceptible nervous temperament.
3. The majority of cases of so-called *madness* in animals, which are usually attributed to *rabies*, are really of the nature of *insanity*, strictly comparable with that of man.
4. The majority of the cases of animal madness which are not assignable to *rabies* are of the character of *mania* as it occurs in *man*.

Various cases, illustrating his opinion that animals are liable to attacks of insanity similar, *mutatis mutandis*, to those occurring in man, are there adduced. These are followed by evidence in favor of the view that hydrophobia in man is, at all events, in many cases, simply the result of mere emotion or imagination—a subject to which he devotes upward of six pages. He concludes this part of the article with the remark that “the late well-known veterinarian, Prof. Dick, of Edinburgh, went so far as to declare that hydrophobia had no real existence at all”—a statement that I can personally confirm. My old friend the professor maintains that he should like to see the mad dog into whose mouth he would willingly put his hand.

The erotomania exhibited by many animals in the rutting season, and the puerperal murderous mania, the *killing instinct*, as Prof. Laycock calls it, are then illustrated by cases.

“If” (says Dr. Lindsay) “animals *feel* as keenly as we do, both in a mental and bodily sense; if they *think and act* in the same way under similar circumstances; if they are subject to the same *diseases* that affect man, and to the same influences that in him give rise to insanity; if medication in their diseases in other animals is conducted on the same general principles as in man, the same drugs frequently producing, under similar circumstances, similar effects; and if the lower animals are equally subject with man to the operation, not only of purely physical, but also of purely *mental or moral* as well as of mixed influences, there can be no reason why the *treatment* of insanity in other animals is not conducted on the

principles which regulate that of human insanity, adapting the details, of course, to the peculiarities of their organization and habits. If this be the case, the present mode of disposing (e. g.) of mad dogs must appear singularly unjust, unnecessary, tyrannical, and cruel.

“For many weighty reasons it seems to me most desirable that veterinarians should give their attention to the study of the *mental* phenomena of animals in a state of disease, and more especially of those forms of animal madness which are not associated with rabies, or other diseases originating in—and sometimes regarded as specific to—the lower animals. We want a series of well-observed and well-recorded cases, illustrating the various forms of *insanity in animals*, ‘madness’ of a kind, that is, strictly comparable with the insanity of man. The veterinarian will have no difficulty in detecting *insanity of action* in the lower animals (e. g., in the dog, horse, ox, and elephant). Insane *acts* in animals may be confined in their effects, as in man, to the individual, e. g., self-starvation or suicide; or they may be extended to other individuals, genera, or species, e. g., the furious, dangerous, or murderous assaults so common in animal mania. These acts include a whole series of peculiarities of conduct—peculiarities, in so far as they are marked and sudden changes from the behavior or habits natural to the individual in health, which changes are, by veterinarians, admitted to rank as *eccentricities*, but which in man would be held as either amounting (in the aggregate, taken in connection with each other, and with certain other phenomena) to insanity, or as constituting its *prodromata*. The veterinarian will have much more difficulty in detecting *insanity of thought*, or idea—what is called in man monomania, *delusional or intellectual insanity*. He has not that assistance in his investigation which is furnished by *speech and writing* in man. Insane *ideas* may have to be inferred from insane *acts*; but there may be really no greater difficulty in establishing or inferring the presence of delusion, of intellectual or ideational aberration, than there is in proving the existence in animals of such faculties as thought, imagination, abstraction, reflection.”

The fourteen remaining pages of the article are occupied with illustrations of (a) diseases common to man and other

nimals, and of (b) diseases propagable to and from man and other animals—a subject to which he has long paid much attention, as his essay “On the Transmission of Disease between Man and the Lower Animals” was published as far back as 1858.

I may incidentally mention that a great deal of information on the connection between epidemics and epizootics may be found in Mr. Fleming’s “Animal Plagues, London, 1871,” work indicative of great research and well deserving of perusal.

Dr. Laycock begins his third lecture (reported in the *Medical Times* of May 15th) with the consideration of what trophic nervous debility is, and how it may be ascertained:

“If we consider what is most common and general to all trophic nerves and nerve-centres when morbid, it is this, that nerve-energy (*vis nervosa*) is evolved either in excess or in defect, with corresponding results as to the nutrition of tissues and functions of organs. When the motor and sensory systems are also involved, there is usually either hyperæsthesia, or pain, or anæsthesia, and palsy or paresis, and these changes may guide us to the nerve-centres affected. In purely trophic neuroses, however, morbid sensory or motor states may not be manifested, and the only means of discovering that there is a trophic neurosis at all is by observation of the known changes in nutrition and function which they cause, being the results of trophic nervous debility, or ‘loss of tone.’ But how shall we determine what special trophic nerves and nerve-centres are involved in this loss of tone, so as to determine causation and treatment? 1. Having ascertained what tissue-changes have occurred, we might trace out the nerves and nerve-centres in anatomical relation with the organs and tissues affected; or, 2. We might reverse the process, and, fixing upon the nerves and nerve-centres—as, for example, those of the sympathetic system—refer the local changes to these, and this might be done by more than one method; or, 3. We might examine clinically into both the trophic and neurotic conditions locally. In all instances the sensory condition should be ascertained; for what we have to determine practically is, whether there be trophic nervous debility, and how it arises; and

much may be done as to the first point by determining the state of sensibility of the skin in different regions of the body as a mere matter of fact, without reference to particular nerves and nerve-centres. For this purpose, the æsthesiometric conditions of their respective regions of distribution should be ascertained. The following clinical illustrations of these neurotic changes, easy to observe and to test, may be useful:

“The glands of the skin, and the products of the cutaneous tissues, are constantly influenced by states of the nervous system differently induced, but with results very instructive as to like changes in other glands and tissues. Some of these can be traced to visceral ‘sympathies,’ or the diastaltic action of viscera on nerve-centres, others to functional or structural disease of the nerves and nerve-centres themselves, so that there is a large class of diseases of the skin which a clinical trophic anatomy of this kind helps to diagnose both etiologically and therapeutically.

“An illustration of this kind stares you literally in the face when you study the pigmentation of the hair on the head and face (grayness), and the varying growth of the hair on the scalp constituting baldness. Are the changes which occur due to loss of tone of the hair-bulbs solely, or are they intimately associated with trophic nervous debility of certain unknown nerve-centres? The facts are not far to seek. In the first place, that regional symmetry which is a chief characteristic of trophesies is very manifest, both as to the extent and order of recurrence of these changes. Look round in an assembly where heads of many bald men are visible (women are rarely bald), and you will find hardly one of them bald over the occiput, and many not gray there, although ‘silvered o’er’ elsewhere. Classify your observations, and you will find that baldness extends from two points, the forehead and the vertex, and ends at a line which, if carried round the head, would touch the occipital ridge posteriorly, and the eyebrows anteriorly. Look, again, at the beards of men, especially as to the order and degrees of development and of grayness, and you will find, on classification, that there are such signs of symmetry and order as plainly indicate correlative trophic centres of nutrition. The face-hair presents like indications.

The region of the eyebrows is certainly a clinical region in brow-ague, herpes, and leprosy. You may subdivide the beard into trophic regions, whether you have regard to development of the cranium, to grayness, or to disease of the follicles. The beard over the lower jaw is almost always gray earlier than that over the upper jaw—viz., the mustache and the anterior portion of the whiskers. Again, certain portions of the beard over the lower jaw—viz., those which are the most constant (the chin-tufts)—are usually the first to grizzle. The connection of grayness with defective innervation is proved by both clinical observation and experimental research. Brown-Séquard found that the hair of guinea-pigs, of which certain nerve-centres had been injured, turned white over corresponding parts of the body; a like fact has been observed in palsies. With this grayness, the protective properties of the tissues are diminished, for in the guinea-pigs just referred to the white hairs were infested exclusively with lice. I have recorded a case of sycosis restricted in like manner to the muzzle-beard.

“In these instances we have illustrations of those conditions of defective nutrient energy known as loss of tone, loss of vital energy, signs of ‘breaking up,’ of ‘decline of life,’ and the like, in which the nervous system is involved, and even indicating which centres are the first to give way, but which cannot be described either anatomically or nosologically, and for which I know no better name than trophic nervous debility. To investigate the causation in the special instances just referred to, we should have to determine, in the first instance, why the head is covered with hair at all, and the forehead bare; why the chin is bearded, and not the cheeks; why there are eyebrows, and why of varying size and shape; why the hairs on the head and face differ. One will say that the eyebrows are for a pent to the eyes, another that the beard is to keep the throat warm, and the mustache to be a respirator; they might with equal validity say that the nose is bare to keep it cool. Such theories of final causes are worse than worthless scientifically. Even the notion that the hair is for warmth and ornament is too restricted, although it be true as far as it goes. Taking the law of evolution as a guide, together

with the law of use, you will find that the hairs of the head and face follow the evolution and retrocession of the nervous system; men get first bald and gray on the top and the temples for the same reason that they decay mentally at the top, and that the animal instincts and appetites survive the memory and the intellect.

“What I have said of the hair applies to the nails, epithelium, pigment-cells, sebaceous glands, and other cutaneous tissues. The changes in nutrition of the nails, in attacks of gout and other constitutional diseases, are well known to close observers. The occurrence of these attacks is sometimes indicated by white lines in the nails, which are symmetrical. The symmetrical character of the bronzing in ‘Addison’s disease’ (a disease of trophic nervous debility) is also an illustration, and is probably due to diastaltic action of the suprarenal capsules, just as pigmentation of the mammary areolæ is due to a like action of uterus or ovaries.

“All these facts must be considered in connection with that other general law to which I have already directed your attention as a guide in clinical observation, viz., that organs and tissues precede nerves in the order of development. Hence we can mark out sectional regions of nutrition and of organs, which are regulated trophically by centric regions of innervation. The diastaltic action of viscera contained in such regions on the corresponding nerve-centres, and through these on other viscera, is an important and common cause of trophesies, and ought never to be lost sight of. The trophic and neurotic sympathies of the uterus, for example, may be classified according to their anatomical manifestation. Gastric ulcer, so common in women, is so often associated with uterine disorder as a cause of that condition of the gastric mucous membrane which predisposes to softening and ulceration, that inquiry into the condition of the uterus should always be made in these cases with a view to treatment. Of course, this is analogous to, but not identical with, the diastaltic vomiting of the early months of pregnancy.

“The comparatively recent experiments of various physiologists on the sympathetic as the vaso-motor system have led to the theories which attribute morbid heat, congestions, effu-

sion, and exudation, to a paresis or palsy of the sympathetic system, the consequence of which is, that the small arteries and the capillaries lose their contractility and retentiveness. But, besides the fact that this view gives us no clew to those changes, which, being chemical, are independent of vaso-motor nerves proper, it is certain that the whole cerebro-spinal system contains both trophic and vaso-motor centres, so that the commonly current theories of vaso-motor activity, which ignore this fact, are of little value. Striking illustrations of this assertion may be seen on careful observation of patients.

“For example, we had a case of probable syphilitic paraplegia in a young man, aged twenty-four, in which there was suddenly complete loss of sensation and motion from the lumbar region downward. If the symptoms had not included more than this, the case would not have taught us much ; but, in addition to retention of urine and fæces from palsy, there was a noteworthy absence of febrile vaso-motor phenomena in the palsied limbs, due to inhibitory influence induced by spinal lesion, for, while in the upper half of the body there were rigors and goose-skin, followed by sweats, in the palsied half, none of these, only a sensation of cold, and this was illusive, for the thermometer marked 104° in the groin, and 103° in the axilla. With this higher temperature in the palsied parts there was no power of resistance to cold, for an ice-bag which had been allowed to remain on the loins for four or five minutes caused redness and blisters where applied. Blisters and sloughing of the soles of the feet had also been caused by a hot-water bottle. In short, as to remedial means we were helpless, because of the spinal lesion. It is of little avail to theorize on these cases ; the practical point is, that with complete anæsthesia and motor palsy the conservative reaction of the tissues as regards heat and cold, and other causes of local disease, and as to the cause of the fever manifested elsewhere, are alike wanting.”

The concluding part of this lecture (published in the *Medical Times* for May 27th) begins with a reference to cases which appeared some years ago, in which he demonstrated the influence of the nervous system on the production, prevention, and removal of dropsical effusions.

He now proceeds to show that the old theory of a "transference of *materies morbi*" will not explain "metastatic dropsy," (so called) any more than it will explain "metastatic" rheumatism, "retrocedent" gout, or the effects of "repelled" eruptions and dried-up ulcers; and to show that "the theory that metastasis is neurotic in origin is sufficient, and is practically available in all cases of the class." "All we have to bear in mind" (he observes) "is, that there are two conditions of the nerve-centres, diverse in results and different in seat, in cases of dropsy—the one condition favoring the occurrence of certain changes, the other inhibiting it. This is the state of things when pain and inflammation cease in one joint and begin in another in gout and rheumatism. There are cases of hemiplegic jaundice, and of eruptive fevers, as measles, in which there is a phenomenon of the same class—on the one side there is a predisposing neurosis; on the other, an inhibiting condition, just as in cases of hemiplegic dropsy. To this class also belong the cases in which there is no eruption, or in which it appears and disappears like an urticaria evanida. A neurotic condition seems to be the reason why tubercles are absent in anæsthetic leprosy. It is only when grave symptoms coincide with a so-called repelled eruption that the neurosis upon which the cessation of the inflammation depends is of serious omen. To this class belong other metastatic phenomena, as, for example, the cessation of the pulmonary symptoms in a case of phthisis when brain-disease comes on. These clinical facts are illustrated by and illustrate the well-known experiments of Claude Bernard on the sympathetic cervical ganglia. It is usually said that the increased heat and congestion which result on the same side as the injury are due to a palsy of the vaso-motor nerves of the part, and no regard is had to an equally constant yet diverse condition, the coldness and pallor, on the opposite side. As a simple fact, we find that, on the one side, vascular activity is intensified, on the other inhibited, with corresponding changes in heat-production and nutrition, just as occurs in the hemiplegic and metastatic cases of dropsy referred to."

From clinical observations in regard to the morbid results of trophic neurosis the professor turns to the consideration of

the practical lessons in the use of remedies that may be deduced from them, and, as illustrative of others, he takes the class of counter-irritants.

Leaving out of consideration the varying results that follow special irritants, and the special actions of oil of turpentine and of cantharides on the urine and the bladder—"we may say further" (he adds) "that, as to the tissues affected, all counter-irritants (among which heat and cold, and other physical irritants, must be included) act either locally on the tissues, including the nerves and blood-vessels, or else on the nerve-centres through the nerves, and thence by reflex action on the same, or a distant organ or tissue. *We thus arrive at this general principle, that the laws of reflex action adapted to a trophic anatomy, and to neurotic changes in tissues and organs, must be our guide in the use of counter-irritants and rubefacients.*

"Having thus, then, widened our view of matters, let us take up a few practical points. Firstly, we desire to alter the condition of the nerve-centres in centric diseases by counter-irritants. The time-honored use of sinapisms to the feet and wrists in apoplexy and comatose affections generally is a familiar example of direct irritation through the afferent nerves; so, also, the irritation of the nasal branches of the fifth nerve in cases of failure of the heart's action; but you may widen much the sphere of these remedies. For example, I have seen cephalic snuffs of great use in epilepsy, and I have no doubt they might be applied with advantage in other encephalic diseases of defective nutrient and vascular activity. The ancient Greeks used this class of remedies so systematically in head-affections that they invented a double-piped syringe for the purpose of injecting counter-irritants into both nostrils at once. In cases in which it is advisable to stimulate the nerve-centres through the afferent nerves, hot applications, as Donovan's button, may be applied, or rubefacients, which excite more or less pain and tingling. In certain cases of paraplegia I have found it very useful to cover the lower extremities with sinapisms for half an hour two or three times a day, so as thereby to excite vaso-motor activity in the motor cord through the sensory nerves. In these cases it is neces-

sary that there be at least sufficient integrity of the sensory nerves and nerve-centres to evolve and transmit the regulative or sensory *vis nervosa*. If there be complete anæsthesia from structural change, little good will be done; but, if the lost or diminished sensibility be only functional, you may reëxcite centric sensory activity by stimulating the sensory nerve-fibrils in accordance with the Wallerian law of line of physiological activity that I previously explained to you; for, just as sensory centric disease may begin at the periphery, so also may the cure. This rule applies to all those trophesies in which there is sensory defect, but not to the extent of absolute anæsthesia—a mere trophic debility being the result. In this numerous class there is commonly a defective evolution of both motor and sensory *vis nervosa*; but, as the evolution of the one is excited by the other, it is plain we must act therapeutically upon the sensory system in the first instance, and this can be done by counter-irritants. It will be a daily problem for you to determine how far pain or tenderness on pressure should indicate or contraindicate the use of counter-irritants. The facts to ascertain are the causes of the pain. Is it due to local causes, as when a wound is inflicted, or, if there be local causes, has pain preceded or followed them? It is too often assumed that the pain is wholly due to local changes; whereas it either precedes or coincides, as in certain sensory trophesies. The connection between pain, as neuralgia, and metastasis in rheumatism and gout, shows how certain trophic changes are dependent on the sensory system. A morbid change is often the more dangerous, in fact, because painless, as in the case of paraplegia I quoted, or because it ceases with cessation of pain, as in metastasis. In examples of this kind, pain is only a stage to that trophic palsy which is indicated by complete anæsthesia. Hence the importance of studying morbid-tissue change in relation to pain and painful states, whether of body or mind, and under this head the relations of neurotic diseases of organs and tissues to mental work, and to mental pleasure and pain."

The professor next proceeds to show that, when there is "trophic nervous debility," rubefacients and counter-irritants may excite a too-ready or morbid reaction, and are worse than

useless, from their liability (as in the exanthemata, in low typhus, diphtheria, and influenza) to bring on low inflammation, if not sloughing.

On the other hand, there are, as he remarks, numerous cases in which there is a healthy or normal reaction against such agencies as counter-irritants, and how shall we use them in these cases (idiopathic inflammations, for example)? If the counter-irritant fails to excite the afferent and regulative (or sensory) system normally, it is useless, and may be injurious. He then discusses the question whether pain in the region of an inflamed organ would indicate the use of counter-irritants, and his conclusion is: "Upon the whole, in acute cases, both experience and theory are opposed to violent (i. e., inflammatory) counter-irritants—rubefacients, at most, being all that are needed, and even these are more doubtful than local sedatives, with warmth and moisture to the skin. The local morbid condition has already caused those centric changes upon which pain depends, and the normal reaction has followed; and, this being so, it seems advisable to relieve the pain, rather than increase it."

After explaining the mode in which counter-irritants act usefully, in reducing absorption in dropsical joints or elsewhere—taking, as examples, blisters, hydragogue cathartics, and the hot-air bath—he concludes with the following illustrations: "Irritants to the stomach act as counter-irritants on the lungs, as well as on the brain; irritants to the kidneys, urethra, and cervix uteri, are counter-irritants to both brain and spinal cord; in short, all the diastaltic motions of irritated mucous membranes are of the nature of counter-irritation, and may be induced artificially. Irritation of the urethra not unfrequently excites violent rigors; and the New-Zealanders adopt a coarse means for this purpose, as a counter-irritant in cases of tetanus."

(For some valuable remarks on the physiological action of counter-irritants, I may refer to some observations by Dr. Brunton, in a subsequent page.)

In his fourth lecture, which treats of "The Trophic Clinical Anatomy of the Cerebellum and the Medulla Oblongata," Prof. Laycock, after a few preliminary remarks, proceeds to

specialize the trophic centres clinically. "There is" (he says) "a numerous class of sensations and feelings well known as 'corporeal,' which are, in fact, trophic. Such are the feelings of hunger and thirst, and their various modifications, and the feelings of bodily comfort and discomfort, of strength and of weakness, and the like. These states of consciousness, whether normal or abnormal, indicate that there is a special *sensorium commune*, in which the condition of organs and tissues as a whole, and the morbid changes therein, are so represented to the consciousness as to induce these feelings, to the end that a proper supply of nutrient materials, and a due accumulation of energy, for the purposes of life, may take place. There is so much unity of function of diverse organs in the actions necessary to these trophic ends, that it is difficult to avoid the conclusion that there is a trophic centre, or series of centres—a sort of corporeal *sensorium commune*—corresponding to the mental or intellectual. In particular, there must be a point where the feelings of bodily health and strength, and those of weakness and illness, are felt. The hypothesis that the seat of these is diffused over the whole body is so contrary to facts, as well as to all analogy, that we need not consider it. Where, then, are the nerve-centres which subserve to the feelings of ease and pain, of strength and health, and weakness, and which regulate trophic and vaso-motor changes? I fix them in the medulla oblongata, pons, and cerebellum, and I look upon the cerebellum as more especially the reservoir and source of motor or executive *vis nervosa*, and the great sympathetic vaso-motor and trophic centre of the body, including the brains. The arguments in favor of these views are detailed in my text-book." (In his "Mind and Brain," to which he here refers, we find it stated: 1. That the cerebellum, in virtue of the decussation of all its commissarial fibrils, is a central unifying organ. 2. That it is not the unifying organ of thought and will, and must, therefore, be the unifier of organic or vegetative life. 3. That it is in the same relation to the anterior and antero-lateral column of the cord as the lateral and posterior gray matter. 4. That, having probably similar functions, it influences all the motor functions of the cord, and through these all the vital activities of the body,

including temperature, secretion, and excretion, nutrition of muscular and other tissues, and coördination of cardiac, vasomotor, and muscular activity.)

“Unfortunately, in the study of the functions of the cerebellum, we derive little direct knowledge from the states of consciousness, simply because, as the centre of organic life, it has no *direct* relations to special conscious states, although it has close functional relations with the brain along the *processus à cerebello ad testes*. Nor is it easy to mark out the line of physiological activity along its three bilateral sets of commissures, viz., the spinal, or inferior; the cerebral, or superior; and the unifying or middle commissures—the crura cerebelli, and pons. I think there are grounds for concluding that, in many cases of general nervous debility, as distinguished from the weakness due to imperfect supply of food, drink, and nutrient materials, and to loss of blood and the like, there is defective functional activity of the cerebellum, and therewith, defective evolution of *vis nervosa*, of which it is, as it were, the storehouse; just as muscular fibre stores up muscular energy. It is, I think, exhaustion of this store that causes the feelings of languor, the desire for rest after much labor (not the aches of weariness, which are derived from the exhausted muscle), and the need for sleep and rest, so as to reaccumulate energy, and replace exhausted materials. It is through the connections of the cerebellum with the genito-spinal centre, that nervous debility is so often associated with exhausting sexual excesses, and with renal and utero-ovarian disorders. The results are very various, because of the multitudinous relations of the cerebellum: while, in some persons, local diathetic diseases, like gout, rheumatism, and syphilis, may be induced, in others there may be central neuroses, like epilepsy, catalepsy, hysteria, and insanity. It is probable, too, that various trophic drugs—the so-called stimulants—act through the cerebellum, and more especially opium, alcohol, and ‘bitters.’

“This view does not exclude the fact that the brain and spinal cord and the special nerves and nerve-centres have each their own stores of *vis nervosa*; for when any one of them, whether motor or sensory, is subjected to exhausting conditions, the results of nervous debility follow. Snow-blindness

is an example of local sensory exhaustion from excess in use as 'writer's spasm' is of motor exhaustion. Tissue-changes wholly local, thus arise from nervous debility of special trophic nerves and spinal nerve-centres; as illustrations, may be mentioned sympathetic ophthalmia, herpes zoster, local oedema and local pigmentations. It is, indeed, as to the diagnosis of these local affections that a clinical trophic anatomy is so important; for, even when the nervous debility is general, no morbid results are not manifested locally as disease or disorder of nutrition until either an exciting or predisposing local cause takes effect. In injury of one eye, for example, there may be no morbid diastaltic action on the other eye as a result until a general morbid state is induced; when that comes on, the local predisposition takes effect, and inflammation of the sound eye follows. In this way many latent causes of local disease become manifest when either trophic debility is induced generally or of a particular nerve-centre. Now, it is impossible, with our present knowledge, to allot particular functions to particular lobes of the cerebellum; all we can affirm is that it is as highly evolved and apparently as complex a structure as the cerebrum, including the hemispheres.

"If we endeavor to determine whether the cerebellum belongs specially to the corporeal or the intellectual system, we at once solve that question by its embryological anatomy. It is plainly a differentiation of the medulla oblongata, and the medulla oblongata is as plainly an aggregate of corporeal centres in relation with it, with the pons, and with the brain and hemispheres above. The medulla oblongata is in the line of physiological activity of all the sensory nerves from the body below, and of all the fibrils coming from the mental region above. It is equally the seat of all those centres which regulate the functions of the heart, lungs, stomach, and their appendages; so that in this, as a group of coördinated centres, we can fix the merely bodily feelings as distinct from ideas or notions of things, and of some, at least, of the corresponding movements, but of communication with the mental region above by complete division of the crura cerebri, and there remains a group of corporeal centres intimately connected with each other, which I term the occipito-spinal area. Of this group the cere-

bellum is the chief, having its own proper connections with the brain proper or cerebrum ”

The professor then makes some remarks on the distinction between the nerves of sense proper going along the medulla oblongata to the hemisphere and the afferent trophic nerves, such as those of touch and of sense of weight. He then points out the value of Claude Bernard's celebrated discovery that pricking the medulla oblongata at a point corresponding with the floor of the fourth ventricle induces glycosuria ; after which he proceeds as follows :

“ Water is an essential constituent of all living tissues, whether vegetal or animal. In neurotic disorders of nutrition (or trophesies) what are termed the animal appetites for food and drink are often modified—eminently so in fever, in dropsies, and in diabetes, as to the water-appetite or thirst. The theories of thirst in fever have been invented without any relation to the thirst of dropsy, and the thirst of diabetes, whether as to insipidus (polyuria) or mellitus (glycosuria), discussed independently of both. That of diabetes mellitus has had various explanations, all having, chiefly, reference to the glycosuria as a cause. An experiment made by Claude Bernard helps us to a simple explanation. He caused polyuria (hydruria) by puncturing the medulla oblongata a little below the point where injury causes glycosuria. Schmiedeberg produced it (as well as glycosuria) by the inhalation of carbonic oxide. It is to this class of phenomena that we can refer the copious flow of limpid urine in hysteric convulsions and in various neuroses in which the genital or urinary system is a starting-point. The thirst caused by corporeal injury, with or without pain, and which distresses the wounded so much on the field of battle, seems to belong also to this class. To understand the practical bearings of these experiments, it is necessary to remember that, like heat, the water in the organism is a fixed quantity, and that there is probably, therefore, a regulative apparatus to maintain it at the healthy or normal amount. If there be too much, it is excreted by the skin or the kidneys, or both ; if too little, the desire for it occurs as thirst. The thirst in both kinds of diabetes (which in other cases, when there is no sugar or area in excess in the urine, is

termed polydipsia) is probably a neurosis of this water-centre; so that one reason why patients in dropsies, as well as in diabetes, pass much urine is, that they drink much. Further, a neurosis of this regulative centre may induce the abnormal production of water from the tissues themselves; for I can confirm the observation made by numerous observers, that more water is excreted in some cases of diabetes mellitus than is imbibed. Something analogous seems to occur in fevers, for Dr. Parkes found more water to be used up in fever than is taken.

"The appetite for food is so frequently modified in disease that it requires particular notice, especially the rarer neurosis termed *bulimia*. When we remember that if, in fevers, in diabetes, and perhaps in phthisis, water be produced at the expense of the tissues from neurosis of the water-regulating centre, we can easily understand that, as the hydrogen of the water must be taken from the hydrocarbons or fats, and the oxygen diverted from its proper uses, there may be a general atrophy as the result of a trophic chemical neurosis independently of manifest cause of wasting disease. From this point of view phthisis, malignant disease, and chronic suppurative and exudative inflammations, are to be classed together as wasting diseases having a common cause of waste. We can also see how cases of diabetes mellitus may—as, indeed, they do—differ according as there is waste of food and tissue in the abnormal production of water, or there is not.

"Trophic neurosis of the medulla oblongata," he observes, "may differ equally in the concomitant sensory or motor neuroses. In many cases of diabetes the skin is more or less anæsthetic and the cutaneous transpiration abolished. Loss of sexual appetite is common; the patient becomes irritable, morose, melancholic, and not infrequently there are deafness and dimness of vision; all symptoms that point to paresis of the occipito-spinal centres." Another fact as to these trophic appetites is, that in both health and disease they are diverted to special things. "I shall only, however, remark now on their relations to the chemical actions of the tissues. We have seen how necessary to all life, whether vegetal or animal, certain mineral constituents are. Chemists dwell emphatically on

lesh-forming or nitrogeous, and heat-producing or carbonaceous foods, but say little or nothing of the foods which contain these mineral constituents—namely, such as chlorine, phosphorus, sulphur, and lime—which are not less essential than nitrogen and carbon. These are chiefly contained in the foods termed herbs and condiments, as onion, garlic, assafoetida, peppers, mustard, water-cress, etc. These are all more or less necessary to the due production of vital energy and *vis nervosa*. To another class belong salt, sugar, vinegar, bitters, and alcoholic stimulants; the appetite for these is variously developed under varying conditions of the nerve-centres. Appetites are sometimes manifested by convalescents which are not so *bizarre* as is usually thought, for they really indicate the need for constituents of living tissue which subserve to vital or nervous energy; for example, a convalescent desire for bitter beer may indicate the need for a tonic; if a patient longs for ham or salt herring, he probably needs chlorides. Lower animals have medicinal appetites as well as man. There are also diathetic appetites, as the love of the gouty for animal food. In the summer we shall consider the morbid or insane manifestations of these appetites—the neuroses known as bulimia, pica, polydipsia, diplomania. Pica in a sick dog is one of the most certain signs of rabies, as it is a striking characteristic of dirt- and fæces-eating maniacs. In like manner the appetites for heat and light are morbidly modified; certain epileptics and maniacs automatically strip themselves of all clothing, just as dying persons automatically throw off the bedclothes.

“It is obvious, from a wider consideration of these facts, that we must look beyond the spinal cord and medulla oblongata for the centres of those instinctive acts which depend upon a due coördination of numerous muscles—often, indeed, of the motor mechanism of the whole body. The sensory centres whence the regulative *vis nervosa* arises, and in which the changes which coincide with the feelings of hunger, thirst, warmth, and corporeal desires, generally take place, are probably in the medulla oblongata, but the whole series of sensory and motor phenomena known as the instinctive include a wider range—a series of corporeal animal centres. The

instincts are variously named, according as the animal is carnivorous or herbivorous; and if carnivorous, according as it takes its prey, and as it prefers blood or flesh, or flesh putrid or fresh, and the like. They also differ in character when the maternal instinct for nutrition of the young animal is active. I place the sensory seat of all these so-called animal instincts and appetites of mammals, including man, in the hippocampus lobe."

He then enters into the clinical anatomy of heat-production, and, after noticing the theories propounded by Bernard, Franke, and Virchow, he proceeds as follows: "Experimental researches point to the medulla oblongata as a thermal centre, for section of it at its junction with the pons Varolii has been followed by intense febrile symptoms; from which we may conclude, at least, that in the thermal, as in the chemical processes, the line of regulative activity is along the medulla oblongata downward. In considering the problem we must not forget, however, that the production of coolness is as much a function of the regulative centre as of warmth. Now that may be exercised in two ways: there may be an inhibition of heat-production in the tissues by stopping or diverting the supply of combustible stuff; or, the heat being produced, or communicated by hot bodies, is carried off by evaporation, to which end fluid is poured out over evaporating or cooling surfaces. In man the skin and the lungs are such surfaces, and hence a regulation of the sweat-glands and of the pulmonary halitus must, from this point of view, be a function of the thermal centres. As a clinical fact, sweats have very important relations to the nerve-centres, and follow those of heat. So that heat, and sweat, and coldness (in fever, *rigors*), and hot, dry skin, and cold sweats, cannot be separated in observation.

"That the nerve-centre of rigors and of the sense of coldness is in this thermal region is probable from numerous clinical observations of localized fever and ague, as of one arm or one-half of the body; their anatomical seat is elucidated by one of Cruveilhier's interesting cases (*a*)—that of a woman, aged sixty-eight, who had continual coldness and rigors, and whose skin felt like that of a cold-blooded animal." (We need

not give all the details of the case, which may be found in the "Anatomie Pathologique, livre xxv.) "On examination, the atlas was found dislocated; the posterior median strands of the medulla oblongata were changed into a gray substance; the cord below was compressed by the atlas, more especially on the right side; and behind and to the left the cerebellum showed a superficial erosion with a brownish-yellow discoloration of its substance. In this case it is to be noted that, with the sensation of cold, there was actual coldness of the skin, and probably of the muscles, causing tissue-cramp.

"Hence the conclusion that both heat-sweats and rigors may be due to both general or local debility of trophic nerves and nerve-centres. Gooseskin is often limited to particular regions, and therefore due to changes in particular nerves or nerve-centres. The sweats of phthisis and of debility in general are neurotic. They are sometimes hemiplegic, or limited to the thorax, the face, the scalp, the lower extremities. They are thus often of value in diagnosis, and, being neurotic, are best treated by nervine tonics. Often, however, sweats are beneficial, because they keep the surface cool when there is excessive thermogeny.

"All these thermal conditions may be reflex and diastaltic. Numerous facts prove decussation of the thermal nerves. If one hand be made cold by being placed in ice-cold water, the other becomes cold also; and this is not due to a general lowering of temperature, because that of the axillæ and tongue remains unchanged. Cooling the hands or feet is an effectual method of causing a parietic urinary bladder to contract. Hemisection of the medulla oblongata or of the spinal cord, on a level with the first cervical vertebra, is followed by increased heat on the same side of the head, hand, foot, wrist, and ankle, and on the opposite side of the neck, trunk, thigh, arm, leg, and upper part of the forearm (*b*). Hence the conclusion that the thermal nerves of the abdominal parietes, pelvic region, thigh, and upper part of the leg, decussate as soon as they enter, or when they leave, the spinal cord. On hemisection in the mid-cervical region, Schiff found the hand and lower portion of the arm to be hotter on the same side as the section, but the shoulder and the rest of the limb to be

hotter on the opposite side. Also the foot and ankle were found to be hotter on the same side, but the trunk, thigh, and leg, hotter on the opposite side. These results of experiments appear to me very worthy notice, because they explain various anomalies which I have observed clinically. A diagonal or circumscribed area of cutaneous inflammation may sometimes be seen in skin-diseases similar to these spheres of heat-production. The law is also specially manifested in cases of diagonal dropsies and in wasting palsies, in which the same crossed morbid action is seen. In all these cases the centric disorder may be unilateral, although the results are shown in the upper portion of the limb, say, on one side, and in the lower portion in the other, for lesion in one half of the cord may affect the direct fibrils on that side and the decussating fibrils entering it from the opposite side. It is probable that the decussations of the sensory nerves of the hands and feet are high up within the cranium, and not in the cord, as is the case with those of the upper arms and thighs, for, being tactile executive instruments, they must have both their special motor and sensory centres within the encephalon. It is for this reason that numbness, as well as motor palsy, beginning in both hands or in both feet, is a sign of intracranial centric disease. In like manner, symmetrical gout of the hands and symmetrical affections of the skin, like purpura and psoriasis palmaris, are associated with trophic nervous debility of centric origin. The hot palms in fever and in various neuroses belong also to this class of symptoms. It is for this reason that the first return of moisture on the palms in cases of fever is so welcome. It indicates returning regulative action of the nerve-centres."

The professor then refers to various morbid phenomena that are rendered intelligible by the decussation of the spinal nerve-fibres in the dorsal region; after which he directs the attention of his class to the "Clinical Anatomy of Purpura and Capillary Hæmorrhages." There is an epidemic fever (prevalent lately in North Germany, and known in Ireland as the "black" fever, and also "the black typhus" and "black death"), in which the chief characteristic is a more or less general purpura, coming on sometimes very rapidly. "Ana-

nical research has shown very clearly that it is a cerebro-nal meningitis, involving the *posterior* surface of the cord, d of the occipito-spinal region, the anterior spinal region t being involved; at present I need only call your atten- n to the coincidence between the purpura and the condition the cerebro-spinal centres, and to the conclusion that the ense cases are only glaring instances of a general law in es of typhus, only that certain vaso-motor and hæmatic ntres are involved. Let us look for corroborative or illus- tive instances. There is a peculiar condition observed in tain cases of mania, in which a bloody tumor forms, med *hæmatoma*. This has been attributed to the vio- ice of attendants, because the subjects of it are commonly rious maniacs; but as careful inquiry as I have been able make has satisfied me that the theory is unfounded. Fur- ar, a like careful inquiry has led me to the conclusion that e vascularity and state of nutrition and development of the r very commonly coincide with similar conditions of the cephalic tissue (*d*). My friend Mr. Jonathan Hutchinson mmunicated, in corroboration, an interesting case of hæma- na of both ears in a woman not insane, but with a physi- nomy indicative of proneness to cerebral disturbance, with ental peculiarities, sleeplessness, and a history of insanity in e family (*d*). Such facts tend to prove a local centre of trition for the ears, and to render it easy to understand how happened that Dr. Brown-Séquard observed hæmorrhages to the skin of the external ear to follow upon certain inju- s to the corpora testiformia of guinea-pigs (*e*). States of con- ousness are associated with like condition of the blood and pillars. I have seen one example of local purpura from ur, and have met with so many recorded cases of general rpura following on a like emotion, that I give this form a ace in my nosology as emotional purpura (*f*). Chronic ief will affect the blood, so as to induce chlorosis; but, in ith, in every act of thought, and more especially in acts of prehensive and emotional attention directed to any part of e body, there is a change in the encephalic centres, such at the circulation within them is changed, and therewith e circulation and nutrition of the blood, and of organs and

tissues to which the attention is directed, are modified too. It is thus we understand the pathology of hysterical hæmorrhages, the localized bleedings in parts of the body corresponding to the localities of Christ's wounds observed in 'ecstatica,' and both the curative and the morbid effects of the imagination considered as acts of morbid attention. As to the pathology of all these various phenomena, it is necessary to study more closely the vaso-motor clinical anatomy and pathology of the encephalon, which we will do on some future occasion."

By a curious coincidence, an article on "Confessions as Criminal Evidence," appeared in one of our cleverest and most thoughtful journals, the *Spectator*, almost simultaneous with, and perfectly independent of, your article in the April number of the JOURNAL.

It is understood to be written by an eminent barrister, and contains so much valuable matter, illustrative of the views maintained in this JOURNAL, that I shall quote very freely from it. I may premise that early in June, C. S. Woolley, the lad who on the 12th of March gave himself up as the murderer of Samuel Lee, the Brompton potman (commonly called "Old Jack"), on the 13th of last August, was tried before Mr. Justice Byles, who in summing up remarked that the only evidence of any importance against the prisoner was his own voluntary confession. The lad was found guilty, and the judge remarked that "nobody who had heard the evidence could doubt the propriety of the verdict." In this opinion the learned judge was certainly incorrect. "There were probably many" (says the writer I have referred to), "certainly there was one shrewd man, who heard the evidence, who had great doubts as to the propriety of the verdict; and, as the judge practically admitted, the whole strength of the case lies in one single question: the value of voluntary confessions, unsupported by circumstantial evidence, as evidence of guilt. Mr. Justice Byles probably knows how very much doubt the most learned members of his own profession have always felt about the worth of voluntary confessions, especially when given, as this was certainly given—though this point was not produced in evidence—by a member of the family liable to hypochondriacal affections, suffering from depression due to other causes at the

time of his surrender, and who had, ten years ago, suffered from specific brain-disease. An old Latin jurist (Calphurnius Flaccus, cited in the famous Talbot-divorce case, seventeen years ago, in which the main evidence was based on the wife's confession of her guilt) said that 'even a voluntary confession is to be regarded with suspicion;' and Lord Stowell, an authority quoted in the same case, to whom Mr. Justice Byles is perhaps more likely to defer, laid it down (*Williams vs. Williams*, Consist., 304) that 'confession is a species of evidence which, *though not inadmissible, is to be regarded with great distrust.*' Now, as Mr. Justice Byles admitted, the case against Woolley rests to all intents and purposes solely on confession. There are no corroborating circumstances of any value, and there are at least two extraordinary difficulties, on the hypothesis of his guilt. One is, that, professing to tell what he did with the old plasterer's hammer, with which, as it had been universally supposed, the crime was committed, and with which, according to the prisoner's account, he did commit the crime, he says he left it in the fireplace of the room where the murder was committed, whereas it never has been found to this day. The other is, that, whereas the amount of blood with which the room of the murder was bespattered was excessive, and the murdered man's clothes were quite saturated with blood, no stain at all was found on the clothes of the slight lad who, according to his own account, committed the crime. Further, he went straight home to his father's house to dinner the same day, arriving there, two miles from the scene of the murder, within an hour and a half of the time at which the deceased was last seen alive, and nothing was observed at all unusual either about his dress or his manner. It was not till three weeks before Christmas that he told his sweetheart, whom he had treated to the Crystal Palace on the 25th of August, that he had something on his mind 'too great to tell,' language altered by misreport into 'too horrible to tell,' and it was not till the 12th of March, when he had quarrelled with his father and was wandering about without a home, that he put his secret into words, and confessed his crime to the police. Yet, when 'Old Jack's' body was first found, he had been the first to

tell his father, and spoke of it 'with great feeling.' It is remarkable that at the coroner's inquest it was publicly stated that the body was found on its back with 'wide, staring eyes,' and that what the prisoner gave as his reason for giving himself up to the police was, that 'poor Old Jack used to stand at his bedside at night, staring at him with those big eyes of his, and he could not endure it.' This is at least just the way in which a morbid expression *would* have grown up. As to the external evidence, the plasterer's hammer was not an instrument which the prisoner would have been specially likely to use, as he was not a plasterer; but it was the talk of the place that this old hammer had been lying there and *might* have been used for the purpose. And, of course, if the impression had grown upon him that he was the murderer, this is the instrument on which his imagination would have fixed. It is certainly most strange that, while apparently anxious in every way to give the minutest evidence as to his crime, he should be able to give no clew as to what became of the hammer with which he says he committed it, except that he left it in the fireplace where it used to be, but where it was *not* found, and that he 'cannot account for it.' Finally, to complete the external facts of the case, the prisoner, a lad of nineteen, was greatly the inferior of the murdered man in weight and size, and yet there appears to have been a great struggle as well as a fearful flow of blood. The prosecution did not attempt to show that the marks of footsteps, other than those of the potman, found in the room of the murder, agreed with those of the prisoner's foot.

"The counsel for the prosecution admitted that nothing was commoner than false self-accusations, but stated that these were usually given under delirium tremens, from which the prisoner has certainly never suffered. It is, however, notorious that false self-accusations arising from general nervous disease are very far indeed from rare. After the mutiny of the *Hermione* frigate, and the brutal murder of its captain, Captain Pigot, during the war of the great French Revolution, the government actuary, Mr. Finlaison, stated that he had himself known at least six sailors who volunteered the confession that they had struck the first blow at Captain Pigot, when it was

demonstrated that not one of them had ever been in the ship, or had ever seen Captain Pigot in their lives. Yet 'they detailed all the horrid circumstances of the mutiny with extreme minuteness and perfect accuracy.' 'At the Admiralty,' says Mr. Finlaison, 'we were always able to detect and to establish their innocence, in defiance of their own solemn asseverations.' Now, the case of this young fellow, coming, as he does, of a family with a hypochondriac strain in it, is not at all dissimilar to that of those sailors. *They* could not have been suffering from delirium tremens at the time of their trial, for many of them had surrendered on foreign stations, to be put in irons on their own confession, and had been sent to England for trial, so that they could not have been drinking for many weeks before their acquittal. Or, take another old case, in which there is no mention whatever of delirium tremens, quoted from Heineccius, in relation to the great Talbot case already referred to: 'A woman having suddenly died, suspicion of poison attached upon her husband. Having been placed in confinement, he stated he had bought poison from an apothecary in the neighboring town, mixed it in a cake, and given it to his wife, who, shortly after feeling the effects, attempted without success to relieve herself by means of an emetic of melted butter, and expired in great pain about four o'clock the following morning. He added many corroborating circumstances, and among others, that, having folded up the remainder of the poison, first in paper, and then in a linen cloth, he had buried it under a sod in a neighboring field. On a more accurate inquiry, this account appeared to be false, for no trace of poison was found in the body, nor could it be ascertained that any poison had been sold; and, although guided by the self-accuser, nothing could be found deposited as he had described.' And this self-accuser accordingly was discharged, though persisting in his confession. Here the only test of delusion was negative, that his own statement of criminal circumstances could not be verified. So far as the plasterer's hammer is concerned, precisely the same may be said of the modern case. For nothing is less likely than that, *after* the murder, a hammer stained by blood should have been stolen by persons *innocent* of the crime, and taken

away from the scene of the murder, where Woolley maintains that he left it. Of course, no one in his senses would run such a risk as that for the sake of an eighteen-penny hammer. Again, take the case of the old Campden murder—the ‘Campden wonder,’ as it was called—which took place in 1660 (and of which a popular description lately appeared in *Chambers’s Journal*). A man of the name of Harrison, living at Campden, in Gloucestershire, having gone to a neighboring village to collect some money, disappeared. His servant, a man of the name of Perry, was sent to look after him. Neither returned that night. Next morning, Mr. Harrison’s son went himself, and met Perry returning. Circumstances were discovered suggesting foul play, and Perry was taken into custody, at first stoutly maintaining his innocence. ‘But, after some days, he desired to unburden his conscience to a magistrate, and he then gave a most minute and detailed account of the murder of his master by himself, his mother, and his brother. The readiness with which his delusion adapted itself to circumstances as they arose, and were thrown into his narrative, is marvellous. Thus, it happened that the brother, Richard Perry, accidentally drew out of his pocket a cord with a noose, and, upon its being shown to John Perry, and his being asked if he knew it, he shook his head, and said, “Yea, to my sorrow, for that is the string my brother strangled his master with!”’ And upon this confession, coupled with other circumstances of suspicion—at all events, not weaker than those attaching to the Brompton case—the three Perrys were executed. Two years later, Mr. Harrison returned to Campden, alive and well, giving a romantic and rather unlikely account of the real cause of his absence, for which he may have had his own reasons. The Brompton murderer has certainly not been convicted on any stronger evidence against him than those three people, who were put to death for a sick man’s fancy.

“For our own part, we do not think that unsupported confessions should be regarded as at all adequate for proving anybody’s guilt. With regard to crimes which morbidly excite the imagination, like murder and adultery, it is far from uncommon for a sick fancy to assume a guilt not really its own,

and to fill up the story by borrowing all accessible details from attendant circumstances. If the murderer can give evidence not yet known to any one else of the disposal of any part of the murdered man's goods, or of the instrument by which the murder was committed, of course, his story is thereby so far authenticated that these details must have been known to him before the morbid excitement produced by the news of a crime could have had time to work. But this is precisely what cannot be done in Woolley's case. He has given no information which either proves that he had more money after the murder than he could have obtained by fair means, or that he knows what became of the instrument with which the murder was committed. The first sign of feeling he gave was on the discovery of the body—three days after the actual commission of the crime—when he mentioned it to his father with visible, though quite natural, emotion. And now, though he accuses himself, he cannot account for any thing which he would not have known, if he be perfectly innocent. We do not say he is innocent; but we do say that the evidence on which he was convicted is of a wholly inadequate kind, and that it is, at least, quite as likely he is innocent as that he is guilty. Mr. Justice Byles was certainly far enough from the mark when he asserted that 'nobody who had heard the evidence could doubt of the propriety of the verdict.'"

There is one remarkable case that the writer in the *Spectator* has overlooked, namely, that of Robinson *vs.* Lane. Dr. Lane was, and I believe still is, the superintendent of a well-known hydropathic establishment, and a man of unblemished character. Mrs. Robinson was a nervous, hysterical lady, who was placed by her husband under Dr. Lane's care. Some time after her return home, Mr. Robinson found in a diary of hers full details of a criminal intercourse between herself and Dr. Lane, written in a highly-erotic style. On this the husband, naturally feeling himself aggrieved, brought an action *or crim. con.* against Dr. Lane, and, if the latter had not been able both to prove that he could not possibly have been present at some of the scenes which she depicted, and to bring forward the evidence of other physicians that she was suffering from erotomania, the case would assuredly have gone

against him on the ground of her written descriptions in her diary, which would rank in the same category as a perfectly spontaneous confession.

The verdict of guilty in Woolley's case, which called forth the article in the *Spectator*, was so opposed to popular feeling that he "was respited during her majesty's pleasure"—a most vague and unsatisfactory ending, as he clearly deserved either to be hanged, or to be acquitted on the ground of insanity.

Several similar cases have lately occurred, and it is much to be regretted that no definite rule is established as to the value to be attached to a prisoner's confession. At the present time Ann Burns is in custody at Wigan, charged by her own confession with the murder of her step-father and of two children she had by him. A surgeon, who was appointed to examine her, reported that "her mind appeared to be rather seriously affected;" and on the strength of that statement she has been remanded for the present. Within a week of this occurrence Henry Hogg, an inmate of the workhouse in the same town, has declared himself to be the murderer of a girl who was killed in that neighborhood some years ago. He is reported "to have been in a low state of mind for some time, and has endeavored to commit suicide."

The fate of these poor creatures is still uncertain. I have yet one more case to notice, which in one respect is the most remarkable of all, inasmuch as the prisoner withdrew his confession:

About a year ago George Dyer gave himself up in London on the charge of murdering one George Wilson, in Australia, nineteen years ago. I learn from a Melbourne newspaper that Dyer has been tried, found guilty of manslaughter, and sentenced to eight years hard labor on the roads. The case is not without its interest, on account of the recantation by the prisoner of his former confession, and of the absence of circumstantial evidence against him. Dyer informed the jury that at the time he made the confession he was "perfectly insane." He was suffering in body and estate, and his accumulated misfortunes had affected his brain. The story he told in London was, that he and Wilson were digging for gold to-

gether at the Mia-Mia Creek, and that in a quarrel he struck Wilson with a spade, which caused his death. He maintained, however, that he was not moved by any murderous intent. At the trial no evidence was produced showing that the prisoner had ever lived at Mia-Mia Creek, and he declared he had only visited it once, when collecting some money owing to him. He explained his confession by supposing that he must have been thinking of an incident he actually witnessed at the diggings. There was a fight among some Chinamen, and from a hole in his tent Dyer saw one man knock down another with a spade, the blow killing him. It should be added that there was no proof, other than the prisoner's own confession, that the remains found were those of Wilson. In this case there has most assuredly been a sad miscarriage of justice; for even if Dyer did murder Wilson, which is far from probable, there was not a tittle of evidence to establish his guilt.

In connection with the pathology of the spinal cord, I may refer to a paper on "The History and Physiology of Hanging," in the *Medical Times* for June 10th, by the writer of this letter, in which there is a description of an improved mode of execution, discovered by Dr. Barker, of Melbourne, who has a wider field of observation in this department than the medical officers of either English or American jails enjoy. In a letter with which, in answer to my inquiries, he favored me, he states that, since he first saw an execution, thirty-seven years ago, he has striven to make the punishment as merciful as possible. He made no less than fifteen post-mortem examinations of criminals hanged according to the old orthodox method, and in not a single case was there dislocation or fracture of the vertebræ, death being caused by congestion of the brain, with strangulation. We must allow him to describe in his own words the nature of the system which he has introduced, and the manner in which he discovered it:

"It was by chance that I was able to suggest the present method, merely through the bungling of the hangman allowing the knot to slip and come on the spine. I have the knot put about two inches from the spine, so that when it is tightened by the weight of the body, the knot comes on the

vertebræ; by the fall the body has an impetus forward, the resistance being at the beam to which the rope is fastened; the knot acts as a fulcrum to push the head forward. By this arrangement, in all cases where the knot has been so situated I have found there was a dislocation between the second and third cervical vertebræ, with fracture of the third, and pressure on the spinal cord. I have always found laceration of the sterno-cleido-mastoid muscles, the muscles attached to the larynx, laceration of the larynx, and generally fracture of the hyoid bone, death in this case resulting from the injury to the spinal cord. Death is so sudden and complete, that in one case a lock of hair, which a man held in his hand at the time of the drop, was found in his hand when he was cut down at the end of the hour; in two or three other cases pocket-handkerchiefs have been similarly retained, and found in the criminals' hands when taken down. I have seen no movement of the upper extremities, but occasionally a little convulsive or perhaps reflex action of the lower. I have often thought of sending home an account of my method to the Humane Society, but have always put it off, expecting to have more leisure, but, if you would publish it, my work would be accomplished without further delay."

If the statements in a paragraph in the *Times* for June 15th are correct, it is obvious that the American system is as bad as that adopted in England. Under the heading "Executions in the United States," it is stated that a murderer executed on the 26th of May, at Evansville, Indiana, died in ten minutes, while another hanged on the same day at Fonda, New York, was pronounced dead in fourteen minutes, and that ten minutes after the rope was pulled up his pulse was still beating. In Ruloff's case the struggle for life seems to have been even further prolonged, if it is true that "at eight minutes the lungs were filled by inhalation; at nine minutes there were twenty-one pulsations to the minute; at twelve minutes the pulse was imperceptible; at fourteen minutes there was no pulsation of the heart; and he was pronounced dead in twenty minutes." Bad as our system is, I know of no parallel to this case; and yet Prof. Houghton, in his essay on "The Physiology of Hanging," published a

few years ago (1866, I think), regarded the American system, when carried out according to his formula, as almost perfect. As his formulæ for hanging by the Irish long-drop and by the American system are probably unknown to most of the readers of these letters, I will endeavor to give them in the simplest possible form. He found experimentally that the shock of one ton (or 2,240 pounds) dropped one foot will break the articular surfaces of the second cervical vertebra. To find the length of the drop that will insure this result, he divides 2,240 by the weight of (what he truly calls) the patient in pounds, and the quotient gives the required result. If, however, the patient is a light-weight, the drop may be inconveniently long; as the gallows cannot be conveniently made of above a certain height. In such a case, he suggests that we should add a certain weight, as is done in horse-racing. Let x represent the unknown weight to be appended to the victim. Then having ascertained the necessary drop by the preceding rule (say, for instance, it is twelve feet), he has found that the equation

$$\left(\frac{2240}{\text{weight of patient} + x} = 12 \right)$$

gives the weight which is required.

He applies this formula to the American system in the following way: "Having found the Irish drop by the preceding rule, use a weight equal to that of the criminal, and let it fall through a height double that of the Irish drop."

Dr. Crichton Browne, the worthy son of a celebrated father,¹ has commenced the publication of his "Clinical Lectures

¹ The following notice of the life and labors of this distinguished man may probably interest many of our readers:

W. A. F. Browne was educated at the University of Edinburgh. He distinguished himself among his fellow-students, and was president of the "Royal Medical Society," "The Hunterian Medical Society," and the "Royal Physical Society," at the same time. After taking his degree, he went to Paris to study psychology, and to learn something of the treatment of insanity in that school, and was a pupil of Esquirol and a friend of Fabret. Upon his return to Scotland he became a lecturer in connection with the Philosophical Institution of Edinburgh, and formed an intimate friendship with Dr. George Combe, and with his brother, Dr. Andrew Combe. At one time he thought of entering upon general practice as a

on Mental and Cerebral Diseases," which promise to be extremely valuable. Thoroughly trained in the asylum from which he derives his Christian name, and now having, for some years, had a large independent experience as medical director of the West Riding (Yorkshire) Asylum, he is rapidly becoming a high authority in his special department. Commencing with the subject of "Brain-wasting," he begins his first lecture as follows:

"You are aware that, if mechanical pressure is applied to a motor nerve in such a manner that, beginning with the slightest contact, it is gradually and steadily increased, even

physician, and was for a few months resident in his native town, Stirling. His disposition, however, led him to desire rather to minister to the "mind diseased" than to devote his attention to bodily ailments; and, when (in 1829) he was offered the position of superintendent of the asylum at Montrose, he accepted the appointment. He remained at Montrose for nearly four years, and introduced the "humane treatment" of the insane into that establishment. During his term of office he published a work entitled "What Asylums were, are, and ought to be." At the end of that time the directors of the Crichton Institution at Dumfries, which was then in the process of erection, requested him to undertake the management of that institution. In consequence of that request, he became the medical superintendent of that institution. At that time it was an asylum only for the upper classes. Out of the profits of the first ten years, a separate establishment was, at Dr. Browne's suggestion, built for the accommodation of the insane poor, and called the Southern Counties Asylum. Up to the present time that establishment has done away with the necessity of a district asylum, which has been found necessary in almost every other part of Scotland.

Dr. Browne remained at Dumfries for nearly twenty-five years. In 1857 he was appointed one of her Majesty's Commissioners in Lunacy for Scotland, and held that appointment until a year ago, when, in consequence of blindness, brought on by too strenuous attention to his duties, both as superintendent and commissioner, he resigned his appointment.

He now holds the honorary office of Psychological Consultant to the Crichton Institution at Dumfries.

His eldest son, Dr. Crichton Browne, is the medical director of the West Riding Asylum in Yorkshire, where he has under his care the largest number of lunatics that are committed to the superintendence of one individual in this country, viz., nearly sixteen hundred. His name is already familiar to the readers of this JOURNAL.

His only other surviving son is a member of the English bar, and the author of the book I am now going to notice.

until the nerve is destroyed at the point of application, no convulsions or spasms, but only deadness and abolition of function, are produced; but that, on the other hand, if even a less degree of pressure is suddenly exerted, violent convulsions and agitations inevitably ensue. Now, what I desire to bring before you in the first place is, that moral or mental pressure on the brain has two distinct sets of consequences according to the mode of its application, corresponding with the two sets of consequences of mechanical pressure on the motor nerve to which we have referred. I have paid some attention to the subject, and have convinced myself on this point: that a sudden emotion—a flash of joy or a pang of grief for which there has been no preparation, and a hastily-imposed intellectual burden—an arduous task undertaken by an untrained mind—are most likely to produce mania or some acute form of mental disorder; and that a gradual emotion—pleasurable excitement ‘long drawn out,’ or a canker-care quietly eating its way, and a slowly-imposed intellectual burden—the cumulative weight of a course of study—are most likely to produce dementia, or a progressive impairment of the faculties. To-day I shall call your attention to certain cases in which protracted emotional tension, due to a succession of deluding joys, or sobering sorrows, or sustained intellectual strain, springing out of growing business engagements and calculations, or other arduous pursuits, have brought on fatuity, premature decrepitude and brain-wasting, and degeneration.

“Unfortunately, such cases are always abundant in this asylum, which derives its population from a busy district, one of the chief centres of high pressure both for boilers and brains, so that I shall have no difficulty in presenting you with illustrations of the condition we are to consider. A very apt example exists in Ward No. 2, in the person of W. W., whose case I would request you to note. This man, who is forty-five years of age, was, until eighteen months ago, an energetic and prosperous accountant in a neighboring large town, and occupied himself in public affairs, as well as in his private business. He worked late and early, lived in a vortex of rivalry and controversy, and greatly overtaxed his strength. At the time mentioned he began to reap the fruits of his rashness: he felt

ill; he broke down in a speech which he was making, and he experienced a partial loss of power in his left arm and leg. He struggled on, however, as he could not afford even to pause in his career, and, as he did so, his infirmities gained upon him. All mental processes became laborious, and many of them ended in confusion. Six months after the first indications of indisposition his speech was almost lost, his left side was exceedingly weak, and his mind was reduced to a state of imbecility. In six months more he was worse, and pauperized, so that he had to be sent to this asylum, to which he was admitted April 5, 1870. Up to the present date no improvement has taken place in his mental or bodily state; indeed, he has declined steadily, in spite of treatment, into almost the last stage of brain-wasting, in which you now see him. You observe that he is a man with a large head, who has been much stouter than he now is, and whose general appearance is that of utter helplessness and second childishness. He cannot walk without assistance; he shuffles his feet along the ground, and droops to the left side. His face is expressionless; his complexion exceedingly pallid. His tongue points to the left when protruded, and the pupil of his left eye is much larger than that of the right. His hands shake so that when he attempts to feed himself he scatters his food about; they are also very feeble, especially the left, with which he cannot grasp any thing. His command over language is very limited. He can say 'book' and 'pencil' when these articles are shown to him, but he cannot form a sentence or give expression to his ideas. When he wishes to say something, his face brightens for an instant, he moves his hand impatiently before him, and is obviously groping for appropriate words; but his efforts are vain, for he can only stutter out 'fine day' or some meaningless phrase. When spoken to slowly and distinctly, he understands what is said to him, and will put out his tongue, take off his cap, or raise his hand, in accordance with the direction given. His emotions are also to some extent active, as he weeps when I speak to him of his family, and ask him if he desires to return home. Now, this man is, as I have said, almost in the last stage of brain-wasting, and has but a short time to live. After years of sustained pressure, intellectual

and emotional, his brain has become deadened and degenerated. An insidious weakness has invaded all his powers. Without any apoplectiform seizure, he has become paralyzed; without any paroxysm of excitement, he has grown fatuous. And when we come to examine his brain, we shall find that, without any traces of an inflammatory process, there is a distinct atrophy of that organ."

The lecturer then proceeds to describe another case in which the entire progress of the disease and its final results, as shown after death, were watched. The following are the chief morbid results: Skull thickened and unsymmetrical; brain weighing forty ounces, five ounces of serous fluid escaping during its removal; arachnoid thickened and of a milky tint; ulci large and filled with fluid. The gray matter pale, and the white matter dusky. Ventricles of enormous size, and full of fluid. Fornix softened, optic thalami flattened and wasted. Pons, medulla oblongata, and cerebellum, weighed five ounces.

This brain-wasting occurs both in this class of cases, and in those who die of senile decay; the brains in the former case becoming prematurely old. From a large experience in wasted brains, Dr. Browne is able to tell us that the wasting "is never general and uniform throughout the brain, but seems to follow a definite course in all cases. It begins and is invariably most advanced in the marginal, the ascending frontal, and the ascending parietal gyri, from which it spreads to the superior frontal gyrus, and the postero-parietal and supra-marginal lobules. After these it involves the middle or inferior frontal and the angular gyri. In severe and protracted cases, the gyri of the orbital lobule and of the temporo-sphenoidal lobe participate in the wasting, but those of the occipital lobe rarely, if ever, do so. You will frequently see the atrophy of the convolutions terminate abruptly at the external parieto-occipital fissure, the occipital lobe remaining plump, while the frontal and parietal are greatly attenuated. Along with the shrinking of the convolutions there is also wasting of the corpora striata, optic thalami, and corpora quadrigemina, which are flattened and altered in outline, the ventricles being unusually capacious. The wasting originates in the cortical substance of the hemispheres, but ultimately extends to the great ganglia at the base.

"I shall next direct your attention to its origin and development, and symptoms, mental and bodily. As might have been expected, its presence is first announced by certain changes in mental processes. The cineritious substance is the first part of the cerebrum to undergo wasting, and suffers more seriously from atrophic changes than the encephalic ganglia. And hence mental precede motor symptoms. The intellect and emotions and appetites, which are dependent upon that cineritious substance for their manifestations, suffer decay earlier than the motor functions, which are dependent upon the encephalic ganglia. This fact, which I regard as certain, may not seem to you to be always borne out by the statements of the patients whom we examine, or of their relatives and friends. We are frequently told that the feebleness of the arm, the drawing up of the mouth, or the thickness of speech, was the first sign of illness noticed, and that, until the appearance of the paralytic phenomena, no mental failure or perversion had existed. Well, statements of that kind are never reliable; and for this reason, that a man's mind may be very considerably weakened without his being at all alive to the fact, or without its being discovered by those who are living with him in familiar intercourse. He performs his ordinary every-day duties with his usual punctuality; and it is not until attention is specially directed to him, or until some extraordinary exertion is required of him, that his deterioration becomes apparent. He who is laboring under a wasting bodily disease is seldom aware of his own degeneracy, until he endeavors to put forth his strength in some more than common effort; and so he who is laboring under brain-wasting may not detect the impairment of his mental powers, until he essays to employ his faculties in something beyond their routine occupation. Where we suspect brain-wasting, therefore, we must not be content when our patient assures us that his mind is sound, and his head as clear as ever. This may merely mean that he can eat his dinner with decency, remember the multiplication table, and wind up his watch. We must gauge his capacity in some less familiar field, put him through some mental gymnastics and exercises, and then determine, upon a consideration of his age, temperament, education, and position, whether his performance is as good as it ought to be.

"As to the period of the recognition of those mental symptoms which mark the earliest stage of brain-wasting, a good deal depends upon the position of the sufferer. If that is such as to call for a display of mental power, then they will be early detected; if not, then they will not improbably be overlooked until paralytic symptoms supervene. In M. G., aged thirty-eight, a Jewish rabbi, who died here from brain-wasting brought on by anxiety and overwork extending over many years spent in Austria and in this country, mental failure was revealed in his repeating himself in his sermons, and in errors and omissions in the services, fully four months before a convulsive fit ushered in the paralytic symptoms. But in G. W., aged forty-six, a laborer, broken down by domestic miseries, who also died here from brain-wasting, last year, no mental curtailment was noticed until paralysis affected his right side. In the upper ranks of society the mental symptoms will, as a rule, be more promptly appreciated, both by the sufferer himself and by those around him, than among the lower classes."

In the following number of the *Journal* the subject of "Brain-wasting" is concluded. The earliest symptoms are failure of attention and loss of memory; and, while the events of yesterday are forgotten, those of twenty years ago or more are remembered. Sometimes there suddenly sprung up what Dr. Browne calls "reminiscent spasms," recollections of a by-gone danger, of a long-forgotten sorrow, etc. As the disease advances, other indications of mental aberration rapidly appear. Judgment is crippled, volition is circumscribed, and confusion of ideas occurs, the affections become frigid or perverted, and diseased appetites also arise. There is a craving for stimulants, and a singular pruriency of thought and conversation. With more pronounced brain-wasting, mental disorder becomes more prominent; the ordinary laws of association of ideas are no longer operative, and all mental processes become visibly slow and laborious, while familiar acts become arduous or impossible. S. H., a barber from Bradford, now in the asylum, used to stop in the middle of shaving his customers until told to go on, and would wander over the country in search of his father who had been dead many years. There is frequently some persistent melancholia; for instance, J. L. thinks he is going to

die in the workhouse, and S. W. believes that there is a conspiracy to put him to a painful death, which he endeavors to escape by jumping with sufficient force on the ground to be swallowed up, and thus to evade the fate prepared for him. General bewilderment, from total loss of memory, then follows; and at last come more complete fatuity, torpor, silence, and helplessness, which merge at death.

The bodily symptoms of this disease are—taking them in the order in which they occur—general weakness and prostration; dull, heavy headache, generally in the vertex, and a singular pallor of the face which persistently remains; occasional cramps or anomalous sensations in the limbs, capricious appetite, constipated bowels, and emaciation. Paralysis then comes on, either insidiously, or consequent on a convulsive attack; the muscles cease to balance one another; one limb is weaker than the other, an eyelid drops, the mouth is drawn at one angle, or the tongue is pushed to one side; articulation is affected, the pupils become unequal, and there is dimness of vision. More distinct hemiplegia then comes on, accompanied by quickness of the pulse, which is also feeble and compressible, and the temperature is slightly depressed, without any of the marked and sudden fluctuations which are characteristic of general paralysis. In the final stages, either the hemiplegia becomes more complete, or the general muscular weakness more extreme, until the face becomes devoid of expression, and the patient is incapable of voluntary movement. Control over the sphincters is often lost, and in this miserable state any attack of slight disease suffices to extinguish the flickering life. The proper termination of the disease, however, is in coma.

“As regards prognosis,” says Dr. Browne, “I need scarcely announce to you that brain-wasting is a very formidable disease, and that, in a majority of instances, it has a fatal issue. But neither need I tell you that it is not necessarily mortal, but that, if taken in time, it is often amenable to treatment. You have seen many patients in this asylum, presenting all its pathognomonic features, who have recovered and gone home quite well. The only rules which I can give you to guide you in prognosis are these, and I am well aware that they are

ery vague: 1. Women recover from brain-wasting more frequently and rapidly than men. 2. The earlier the age at which brain-wasting occurs, the better is the prospect of recovery. 3. The more decided the paralytic symptoms, the worse is the prospect of recovery.

“What, then, is the treatment under which favorable results may be obtained in cases of brain-wasting? It has been almost invariably the same, and has consisted in the administration of cod-liver oil and the hypophosphite of soda, with the occasional addition of small doses of tincture of opium and sulphuric ether. We owe a debt of gratitude to Dr. Laddell for pointing out the value of cod-liver oil and the hypophosphites in debilitating nervous diseases. They supply the essential elements of nerve-nutrition in an easily-assimilable form, and are unmistakably beneficial in cases of brain-wasting. A tablespoonful of cod-liver oil, and fifteen grains of the hypophosphite of soda, given twice or three times a day, at the outset of such a case, often arrest at once the downward tendency, and induce restoration of mental and muscular power. Sometimes, when these remedies seem ineffectual, or when they are slow in their operation, doses of from five to fifteen drops of tincture of opium and sulphuric ether, twice a day, expedite their action, besides conferring independent benefits. The opium gives, as it were, a fillip to cerebral nutrition, and thus diffuses a favorable influence through the whole economy. Under its use the whole tongue cleans, the appetite improves, the bowels become regular, the muscles strong and steady, and the mind clear.

“Along with the medical treatment of brain-wasting, dietetic and moral treatment must be carefully attended to. A liberal and highly-nourishing diet, with a regulated quantity of wine in some cases, must be allowed. Fresh air and freedom from anxiety and harassment must be secured. The mind must be kept either in a state of entire rest, or only light and agreeable occupation permitted.”

The lecture concludes with notices of three cases of brain-wasting which Dr. Browne has successfully treated, and which left the asylum fit to resume their ordinary avocations.

Dr. Bacon, of the Cambridge County Asylum, takes exception to a remark by an eminent physician in the last volume

of the Guy's Hospital Reports, in which it is asserted that the term general paralysis of the insane is equally applicable, in so far as paralysis is concerned, to other affections. In his paper on this subject, in the July number of the *Journal of Mental Science*, he observes that "general paralysis of the insane has some peculiarities in its history and symptoms which may serve to discriminate it from other forms of disease, such as these :

"It is not hereditary.

"It occurs but rarely among women.

"Certain mental symptoms are always associated with it, and generally precede the paralytic symptoms.

"In most cases epileptiform attacks, affecting one side or one limb and half the face, occur during the second stage.

"A curious amelioration takes place after a certain period, when cases are brought early under proper treatment. The 'optimism,' the often furious character of the mania, the destructive tendencies, and the mixture of elation and confusion of mind, producing the most ludicrous contradictions, are such as are not seen in other forms of brain-disease.

"These phases recur so constantly, and in so many instances, that I do not see how to doubt that there is such a disease, whatever its name, and that it differs from others in which patients fade away gradually and die paralyzed. It may be that those living in asylums have a more vivid impression of their own cases from seeing so much of them, and being so often perplexed in their treatment, and they may not be sufficiently attentive to other phases of brain-degeneration; but it seems to me that history, symptoms, and pathology, point to a disease different from any other, and that the symptoms I have alluded to almost suffice to answer the question, 'What is intended by the term general paralysis?'

"Believing that general paralysis of the insane means a certain degeneration of brain, and has a pathological basis, it seems to me impossible to talk of a patient's recovery, or to share the sanguine views of a physician who thinks he has cured a man by calomel-baths, because the patient *appears* well nearly a year after. Every one knows there are long remissions in this disease, and I have had several patients who have kept

t of the asylum for a year or two, but they inevitably come back to die. Whatever the hopes of the therapeutics of the future, I can see no reason to wander through the pharmacopœia in search of a drug to cure a disease which depends essentially on structural changes, when we know that these, at least in the brain, are not remedied by medicines.

"In conclusion, I should say that what is called general paralysis of the insane is a special form of brain-disease, that has a definite and regular course, with peculiar mental symptoms, which almost suffice to distinguish it from other forms of disease in which body and mind decay together."

Dr. Hughlings Jackson has published a sound practical paper "On the Routine Use of the Ophthalmoscope in Cases of Cerebral Disease," in which he further supports the view which he advocated some years ago, that "very striking ophthalmoscopic changes may exist when the patient believes at his sight is good, and when he can read the smallest type." There are few cases, he observes, on which such divergent opinions are given as those of cerebral tumors and other kinds of "coarse diseases," under which term he includes not only tumors, ordinarily so called, but all kinds of advenitious products. "They often begin by symptoms which are not specially nervous, although really dependent on brain-disease. The early symptoms are often put down to stomach derangement, to overwork, or to some other minor cause. The patient is naturally very anxious to put forward the view that his severe headache, vomiting, etc., are owing only to some temporary derangement, and mostly accuses the liver. He may urge that his illness began by 'attacks of bile.' I have known the friends of a patient lament bitterly the different opinions that have been given at the early and late stages of a case of cerebral tumor. Every practitioner will know cases of young men who have first severe headache, and perhaps urgent vomiting, and scarcely other symptoms, and who occasionally for weeks, or even for months, remain able to do their work somehow, especially if, as occasionally happens, the severe pain in the head only comes on in the night. In the absence of renal disease being ascertained, the symptoms give strong evidence of the existence of 'coarse' disease inside

the head. We often see patients blind from optic neuritis, especially in children who are reported to have had 'bilious fever.' It is frequently the 'fever' that attends coarse disease of the brain. I feel sure that the use of the ophthalmoscope would sometimes save us from the mistake of declaring the symptoms of a case to be of non-cerebral origin, because, superficially considered, they seem to refer to other organs than the brain. In all such cases the ophthalmoscope should be used, *whether the patient complains of defect of sight or not, and when he can read the smallest type.* Although the absence of optic neuritis would not negative the existence of coarse disease within the cranium, the presence of the neuritis (double) would, I think, render the existence of this kind of change *almost* certain in many cases of very severe headache without renal disease; we cannot be quite certain. I had about a year ago a patient under my care, the whole course of whose symptoms, and double optic neuritis was discovered, seemed to point to coarse disease of the brain; but there was no such change found post mortem; the brain was very much wasted. Nevertheless, I repeat, double optic neuritis occurring along with intense headache, and especially with vomiting (perhaps bilious), is *almost certain* evidence of the existence of coarse disease of some kind, not of any particular kind, within the cranium.

"In cases of loss of speech (aphasia), there may occasionally be discovered marked optic neuritis, when there is nothing in the patient's bearing to suggest that his sight is defective.

"In children it is absolutely necessary to use the ophthalmoscope when they suffer from severe cerebral disease. We occasionally discover optic neuritis in a child whose parents 'have never noticed any thing the matter with his eyes.'

"In cases of acute cerebral disease the patient may be too ill to take any notice of our attempts to test his sight. Here, again, we must use the ophthalmoscope."

The paper concludes with a series of cases, original and collected, in which optic neuritis from various intercranial causes has *not* produced injury of sight, and with a warning against our mistaking mere physiological peculiarities for morbid changes of the optic disks.

Dr. Charles Elam, the author of "A Physician's Problem," has lately read at the Royal Medical and Chirurgical Society a paper upon "Partial Acute Idiopathic Cerebritis," and although I very much doubt whether the profession generally will indorse all his views, his memoir, which is chiefly devoted to the contrasts between general and partial acute idiopathic cerebritis, is deserving of notice, and may prove useful if only by the further investigations to which it may lead.

"The most striking feature in the history of partial cerebritis is the occurrence of remissions in the course of the disease, often so marked as to simulate restoration to health. This is illustrated by some cases both of constitutional origin, and arising from external violence. In two of these, where the patients had been for some time apparently moribund, there was so entire a remission of all the symptoms that for some hours nothing could be detected indicative of any disease whatever. One was a case of fracture of the skull, where there was a fissure extending from the middle of the left parietal bone down to the foramen magnum. This kind of remission, combined with the previous history, was shown to be characteristic of this disease, and to distinguish it from all others. The diagnosis of this disease is not difficult. It differs from the various forms of 'softening,' clinically as thus: 1. From the apoplectic form, in the absence of aphasia and paralysis as well as other general features of progress. 2. From the convulsive form, in the absence of epileptiform attacks at the beginning, and the greater constancy and duration of the convulsions when established later on in the affection. In this disease, also, convulsion lasts to the end; while in softening death is generally 'tranquil and peaceful.' 3. From the delirious form, by the mode of invasion, which is never by delirium; and by the less marked character of this symptom throughout. The pathological features also differ materially from white softening. The color alone is a sufficient distinction from the 'red' and 'yellow' forms. Besides many other important differences, the section is distinctive, being expressed in partial cerebritis, very often elevated, as though swollen in softening. The general aspect of the disease

makes it most liable to be confounded with typhus. From this it is distinguished by the mode of invasion, and the marked preponderance of active brain-symptoms. The *étiology* of this disease is closely allied to constitutional cachexia, chiefly of a tubercular nature, and to hereditary predisposition. The prognosis is very unfavorable; but there are considerations, both of a clinical and pathological nature, that lead to the conclusion that it is not always fatal. In treatment, although little can be done of a curative nature, there is a fact which is occasionally of the highest importance to remember. For business or family reasons it is often especially desirable to obtain a few hours of clear intelligence. This occurs in the remissions already referred to; and the practical point in question is this: that this remission may be often insured in the early and middle stages of the disease by the exhibition of a smart purgative, as a drop of Croton-oil, with or without a blister to the head."

• Dr. Elam concludes his paper with the following

Tabular View of the Contrasts between General and Partial Acute Idiopathic Cerebritis.

GENERAL CEREBRITIS.	PARTIAL CEREBRITIS.
<i>1. Complications.</i>	
Described as inflammation of the brain-substance alone, the meninges being unaffected.	Never confined to the brain-substance alone. Meningitis, local or general, always present.
<i>2. Extent.</i>	
Extending through the whole substance of the encephalon, except the meninges.	Partial; generally a small patch, limited to a portion of one side; usually superficial.
<i>3. Period of Life.</i>	
Occurs usually between the ages of eight and thirty; never after thirty-five.	Rarely, if ever, occurs before the age of forty.
<i>4. Mode of Invasion.</i>	
By vomiting.	By fainting, or a very slight apoplectic seizure.

5. *Termination.*

Always in death.	Very fatal, but perhaps not so uniformly so as the "general" form.
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6. *General Symptoms, Duration, and Progress.*

Symptoms comparatively mild, and wanting in general significance. Progress uniform and uninterrupted, from commencement to death, which occurs between the second and twelfth day.	Symptoms most varied and severe. Progress never uniform, but broken by remissions, sometimes so complete as to simulate perfect restoration to health. Duration, from three to six weeks.
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7. *Prodromata.*

None.	Always present; sometimes of a somatic, sometimes of a psychical order, or both.
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8. *Paralysis.*

Generally none.	Some marked weakness, but variable and dubious.
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9. *Convulsions.*

None, until very near the close.	Always present at some, and generally at an early, period of the disease; persistent to the end.
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10. *Coma.*

Only occurring at the close of life.	Occurs early, sometimes at the earliest symptom; departs and recurs irregularly.
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11. *Delirium.*

Mild and inconstant	More irritable and violent in character; often muttering; not constant.
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ART. III.—*Medico-Legal Notes on the Case of Edward H. Ruloff; with Observations upon, and Measurements of, his Cranium, Brain, etc.*¹ By GEORGE BURR, M. D., of Binghamton, N. Y.

MR. PRESIDENT AND GENTLEMEN OF THE MEDICO-LEGAL SOCIETY :

IN rising to submit for your consideration what I am about to present, I do so with a certain degree of embarrassment, caused by a distrust of my own ability to do justice to your expectations, and an apprehension that my paper may not be sufficiently complete to make it any thing like a suitable contribution to the objects of your Society. If what I am now about to lay before you shall be deemed worthy of your approval and commendation, I shall be abundantly compensated. If, on the other hand, its faults should be too glaring, and its deficiencies too apparent, I respectfully beg permission to bespeak, beforehand, your liberal indulgence.

Edward H. Ruloff was executed at Binghamton, N. Y., on the 18th day of May last (1871), for the murder of Frederick A. Mirrick.

IN order the better to comprehend the various points of alleged error on the trial; the several medico-legal questions connected with the case, as well as the more satisfactorily to compare the peculiar characteristics of the man with the post-mortem examinations, and the size, form, and other peculiarities of the cranium and brain; the circumstances attending the homicide, and the previous history of Ruloff, should be briefly recapitulated. The circumstances of the murder for which he was convicted and executed are substantially as follows :

Mirrick was a clerk in the store of Halbert Brothers, dry-goods merchants, doing business in Binghamton, and, in company with a fellow-clerk, Gilbert S. Burrows, occupied the store as a sleeping-apartment—a bed or cot was so arranged, that it could readily be prepared for such a purpose after the

¹ Read before the Medico-Legal Society of New York City, September 14, 1871.

business of the day had closed. On the morning of Wednesday, August 17, 1870, at about half-past one or two o'clock, these young men were awakened by some unusual noise, when they discovered three men standing near their bed. These men had burglariously entered the store, and had made some progress in removing packages of silk goods. Two, at least, of the men wore masks. The two clerks sprang from their bed, and a conflict immediately ensued—they attacking the burglars. Mirrick drew a pistol and snapped it twice at them, when two of them retreated down-stairs into a lower story. The third remained, and struck Burrows on the head with an iron chisel; but he was immediately thrown down by Burrows, who wrenched the chisel from his hand, and with it struck him a blow, inflicting a wound over the right eye. Mirrick likewise struck the prostrate burglar a blow with the round top of a stool, such as is used in counting-rooms; upon which he (the burglar) called loudly upon his retreating comrades for help. They immediately returned. The first, as he reached the head of the stairs coming from the lower story, was seized by Mirrick, and a violent struggle ensued, during which the burglar (now known to be Jarvis) was thrown upon his back over a counter, and Mirrick was above or over him, holding him in that position. As the other or third burglar came up the stairs, Burrows, supposing his first man disabled, advanced to meet him, and threw his chisel at him, which took effect upon his scalp. This burglar returned the assault by firing a pistol three times in quick succession; the last shot, striking the bannister, caused slivers to fly into Burrows's face, when he, supposing himself seriously wounded, made no further attempts at resistance. The third burglar then passed directly to where Mirrick and Jarvis were engaged, and, seizing Mirrick's head by his left hand, drew it on one side, and discharged the contents of his pistol into its back part. The ball entered on the right of the occiput, passed into the cavity of the cranium, wounding the right lateral sinus, and a portion of it was afterward found upon the floor of the right lateral entricle. Death ensued in about an hour. The burglars immediately fled. Meantime, Burrows had given the alarm, and officers and citizens rallied. Pursuit was instituted, but

no trace of the burglars could be found. During the ensuing day the authorities, both of the county and city, were actively engaged; and measures were taken to secure, if possible, the arrest of the perpetrators of the crime. Patrols were stationed, during the succeeding night, to watch every avenue of egress from the town. Ruloff was arrested about one o'clock that night by the patrol stationed along the Erie Railway track, east of Binghamton. When first observed, he was stealthily making his way along the track in an easterly direction. He was ordered to halt several times, but refused; just then a train of cars, coming up, intercepted the approach of the patrol to him, and, when the train had passed, he was nowhere to be seen. Two hours later he was discovered in an out-house on premises adjoining the railway. He was then taken to town, and locked up in jail. The next day he was brought before the coroner's jury, when he gave his name as Charles Augustus; afterward it was George Williams. Up to this time he was unknown to every person present. While before the coroner's jury, and undergoing an examination, he was recognized as Edward H. Ruloff by Hon. Ransom Balcom, a justice of the Supreme Court, before whom, in former years, Ruloff had been on trial. After having been examined at some length, the coroner discharged him; but, soon after, new facts coming to light, he was pursued, retaken, and brought back to jail. The next morning (Friday) the bodies of two men were discovered floating in the Chenango River. On bringing them to the shore, portions of false faces were found hanging by strings about their necks; one had received a wound, as from a blow upon the left side of the forehead; a ball of twine, corresponding in all respects with that with which the bundles of silk goods had been secured, was found in one of their pockets; the bits, with which the back-door of the store had been bored, were also found in another pocket; and other circumstances, which fully identified them as the bodies of two of the three perpetrators of the crime. In attempting to wade across the Chenango River, in their flight from the store, they had plunged into deep water, and had been drowned. During the day a photographic picture of the bodies, as they lay side by side, was taken, with a view to sub

sequent identification. Ruloff, on being brought to view the bodies, denied all acquaintance with or knowledge of them. The coroner now decided to hold him (Ruloff) in custody, to await the action of the next grand jury.

A bill of indictment was found against Ruloff at the September term of the Court of Oyer and Terminer. On being arraigned, he interposed the general plea of not guilty. The trial, on his own motion, was put over until the next January term.

At the ensuing January term of the Court of Oyer and Terminer held in and for the county of Broome, the trial took place: Hon. Henry Hogeboom, of the county of Columbia, and a justice of the Supreme Court, presiding. Hon. M. B. Champlain, Attorney-General, Peter W. Hopkins, Esq., District Attorney for the county of Broome, and Lewis Seymour, Esq., a counsellor of the Supreme Court, appeared for the people; and George Becker and N. D. Whitney, Esqrs., of Binghamton, and Hon. Charles L. Beale, of Columbia County, for the prisoner. The trial continued for eight days, at the end of which the jury returned a verdict of guilty of murder in the first degree; and the prisoner was sentenced to be hanged on the 3d day of March following. On the 25th day of January, 1871, Judge Hogeboom allowed a writ of error, which brought the case before the General Term of the Supreme Court, held at Albany on the 7th day of February; but, in allowing the writ of error, Judge Hogeboom refused to grant a stay of proceedings. The case was argued at this General Term of the Supreme Court, and the judgment and sentence of the Broome Oyer and Terminer were affirmed. On the 28th day of February, three days before the time appointed for the execution, Judge Rapallo, of the Court of Appeals, allowed a further writ of error, and a stay of proceedings, thus bringing the case before that tribunal. The Court of Appeals sustained the finding of the courts below, and Ruloff was taken before the General Term of the Supreme Court in session at Elmira in April, and was there sentenced to be hanged on the 18th day of May. The sentence was carried into effect on that day, and Ruloff paid the penalty of his crime with his life.

The points of alleged error upon which the case went up to the Court of Appeals were of a purely legal character, and do not involve questions in medical or physiological science. There was no pretence of insanity at the trial—no question as to the effect of the pistol-shot wound in causing the death of Mirrick.

It may not, however, be entirely useless to refer to at least two of the points of alleged error which the plaintiff in error (Ruloff) urged before the Supreme Court and the Court of Appeals. It will be remembered that the two clerks began the affray. When first awakened, they discovered the three burglars standing near the bed, and they at once attacked them, Mirrick snapping his pistol two or three times. Two of the burglars retreated down-stairs, the other returned the assault by striking Burrows on the head with the chisel. It was argued by the prisoner's counsel that the subsequent killing could not be, as the jury had found, "murder in the first degree," but that at most it was one of the lower grades of manslaughter; that at the time Mirrick himself was engaged in "a felonious attempt unnecessarily to kill an intercepted felon, and was doing him great bodily harm; that the killing was done in resisting such attempt, without felonious intent," and that "in making this attempt, Mirrick was *himself* a wrong-doer, and not under the full protection of the law."

During the trial, the counsel for the prisoner requested the judge to charge in favor of this view, of the transaction as a matter of law; this his Honor declined to do, holding that they were questions of fact upon which the jury must find.

Another point was somewhat novel. It was important that the bodies of the two drowned men should be identified. No one who saw them, recognized either one. They had lain in the water two days; were now exposed to a warm atmosphere, and decomposition was rapidly progressing; and unless their present appearance could be preserved, in a few hours all hopes of recognition would be gone. A photograph picture was therefore taken of the bodies, which, by means of a stereoscopic instrument, enabled acquaintances subsequently to recognize in them the persons of Jarvis and Dexter, both ascertained to be comrades and associates of Ruloff. Counsel

for the prisoner objected on the trial to any evidence of identification being received, founded upon an examination of the pictures. The objection was overruled, and exception taken. In this case there were other circumstances which corroborated the testimony of the witnesses who identified the bodies from viewing the pictures, and which established their identity beyond all doubt; but as this kind of evidence is quite likely hereafter to be employed in various ways upon the trial of cases, the remarks of Judge Potter, one of the judges of the Supreme Court, holding the General Term, in discussing the point, may very properly be quoted. He says: "It is the every-day practice to use the discoveries in science to aid in the investigation of truth. As well might we deny the use of the compass to the surveyor or mariner; the mirror to the truthful reflection of images; or spectacles to aid the failing sight, as to deny in this day of advanced science the correctness, in greater or less degree depending upon the perfection of the machine, and the skilful admission of light, to the photographic instrument, its power to produce likenesses; and upon the principle, also, that a sworn copy can be proved when the original is lost or cannot be produced, this evidence was admissible." As germane to this point, I add the following, taken from the *New York Evening Post*, which, although a newspaper paragraph, is somewhat significant of the future employment of photographs upon the witness-stand:

"An Australian gentleman, examining a mining claim, was seized, stripped, and covered with tar and wool. He went and got himself photographed in this guise, and sued his assailants for two thousand dollars' damages, putting in his picture as evidence."

All the points of alleged error made in the case of Ruloff, as is well known, were overruled by the Court of Appeals, and the decisions and rulings of Judge Hogeboom on the trial confirmed, as also the finding of the jury. It is proper now to state that Ruloff, before his execution, admitted that the bodies found in the Chenango River were those of Jarvis and Dexter; that he had been associated with them for years; that he was the third man present in the store that night; and that he fired the shot which was fatal to Mirrick. He, how-

ever, disclaimed all intention of murder on entering the store, and declared that, if the young men had kept quiet, they would not have been harmed.

This admission of Ruloff of the correctness of all the proceedings in his case, while it ought not perhaps to lead us to believe in the infallibility of our courts, yet it should inspire us with confidence in their ability to ferret out crime, and in the correctness of their findings, when the law is administered by an able and upright judge, and the facts are passed upon by a conscientious and fearless jury.

Long before the murder of Mirrick, Ruloff had attained an extensive and wide-spread notoriety for crime. Not only in the public estimation was he thus connected, but in the recorded judicial proceedings of our State his name stands conspicuous. Nearly thirty years ago (in 1842) he first appeared in the vicinity of Ithaca, in the county of Tompkins. He here engaged in various avocations—laboring, teaching school, studying medicine with a botanic physician, and finally practising in the neighborhood as a botanic physician. He also gave some lectures on phrenology. He married a young lady of that vicinity, and in due time a daughter was added to his household. Both his wife and child suddenly disappeared. Neither has been seen or heard from since the 24th day of June, 1845. The accounts which Ruloff gave for their disappearance were contradictory and evasive. It was known that disputes and bad feeling had been engendered between him and his wife, and her family, and it soon came to be generally believed that he had murdered his wife and child, and that he had sunk their bodies in the waters of the Cayuga Lake. That belief prevails to this day.

Ruloff was soon after arrested for the supposed crime. An indictment for forcibly abducting and imprisoning his wife was found against him, and in January, 1846, he was found guilty of this offence and sentenced to the State-prison at Auburn for ten years. This term he served out in prison. At the close of his term of imprisonment, and while in the office of the warden, before he had passed outside the walls, he was again arrested by the sheriff of Tompkins County on an indictment charging him with the murder of his wife, and he

was at once taken back to the Tompkins County jail. This indictment was never brought to trial, a *nolle prosequi* having been entered in the matter; but in June following (1856), an indictment for the murder of his child was found against him, upon which he was arraigned and pleaded not guilty. On application to the Supreme Court, it appearing that an impartial trial could not be obtained in the county of Tompkins, an order was made that the indictment be tried in the county of Tioga. The cause (having previously been removed from the Oyer and Terminer to the Supreme Court by writ of *certiorari*) came on for trial at the Tioga Circuit, before the Hon. Charles Mason, one of the justices of the Supreme Court, on the 28th day of October, 1856.—(*Vide 3 Parker's Criminal Reports*, p. 401.) Upon this trial the prosecution relied upon certain facts and circumstances to make out their case, they having no proof by direct evidence that the child was dead or had been murdered, or that her dead body had ever been found or seen by any one. The jury, instructed by the court that the *corpus delicti*, the body of the crime, could be "established by circumstances proved so strong and intense as to produce the full certainty of death," brought in a verdict of guilty, and Ruloff was sentenced to be hanged.

Thus, according to the finding of the several juries engaged in this case, the anomalous fact was established that Ruloff abducted his wife and murdered his child, although they both disappeared at the same time, and neither has been heard from since.

The General Term of the Supreme Court of the Sixth Judicial District, composed of Judges Mason, Gray, and Balcom, affirmed the rulings and findings of the Tioga Circuit, Judge Balcom dissenting; and at a subsequent term of the same court, Ruloff made a motion for a stay of proceedings, which he argued in person, but which was denied, and he was again sentenced to be hanged. A stay of proceedings was, however, at length obtained by his counsel, and a writ of error allowed, which brought the case to the Court of Appeals, where the verdict and judgment of the Supreme Court were set aside, and a new trial ordered.

It was pending these proceedings, while lying in jail at Ithaca, that Ruloff became acquainted with young Jarvis, then

a sprightly lad, and also with his mother, the wife of the jailer, over both of whom Ruloff obtained a most powerful and fatal influence, and by whose agency it is supposed he was enabled to break jail and escape. This he did, and while a fugitive, and wandering about the hills of Western Pennsylvania, he froze his foot, causing the deformity which connected him with so much certainty with the crime at Binghamton.

Ruloff was in time retaken and brought back to Ithaca. About this time the decision of the Court of Appeals having been made known, the public indignation culminated in a determination on a day appointed to force the jail and to inflict upon Ruloff the punishment which they believed he had evaded by the technicalities of the law. The day before the appointed time, the sheriff quietly removed him to the jail of Cayuga County, where he remained until the order for his release was received.

At this result the disappointment and excitement of the people of Tompkins County and vicinity became intense. They believed that a felon had escaped a just and well-deserved punishment. And when the enormity of the crime was remembered, no less than the murder of his own wife and child, the successful concealment of the bodies, the tact and ability he had displayed in the various legal proceedings, his reputation for scholastic attainments, and the success with which they believed justice had been foiled, all conspired to produce a degree of exasperation throughout the entire community heretofore unequalled. With the lapse of years this excitement had died away, but the deep conviction of Ruloff's guilt remained. When, therefore, he appeared again upon the scene as a participant in the murder of Mirrick, at Binghamton, the popular excitement was renewed with the utmost fury. The public sentiment now demanded that justice should not again be evaded; but that the law should be vindicated and its penalties paid. And when subsequent events connected with his life were made known, exaggerated and colored as they undoubtedly were by the newspaper press, he came to be regarded as a criminal of the deepest dye; while his attainments in learning, and the intellectual ability he had displayed in various ways—his plans, his successes, his trials, his escapes—had

in the imagination of the people surrounded his history with a tinge of romance not inferior to that of Eugene Aram.

After Ruloff's release from the custody of the sheriff of Tompkins County, in 1860, he seems to have at once fallen into a life of criminal associations and practices. If we can believe his own declaration, however, he desired to pursue an honorable course, and was actually engaged in teaching in North Carolina, when a cry of distress from Jarvis, who was in jail at Buffalo, induced him to give up his situation at the South, and go to the relief of his former friend.

From this time the associations of the two were intimate. They established their headquarters in the city of New York, whence they made incursions upon various parts of the country for the purposes of plunder, and to obtain the means of support. Ruloff also was engaged upon the work on philology, which he had projected, and of the success of which he seems to have had the most extravagant anticipations. He was, however, unfortunate in being frequently caught while making his forays upon the public. During the ten years from 1860 to 1870, under various *aliases*, he served terms of imprisonment in the State-prison at Sing Sing, in the Connecticut State-prison at Wethersfield, and in the New Hampshire State-prison at Concord.

Ruloff, as has been stated, was executed by hanging, on the 18th day of May, 1871. The mode selected was by jerking him up while standing upon his feet, by letting fall a heavy weight.

For the observations made at the time of the execution, the post-mortem appearances, the preparation of the specimen, the measurements of the cranium and face, and the notes upon the brain, I am indebted to my son, Daniel S. Burr, M. D., who was present at the execution, and who conducted the examinations with accuracy and care.

A few involuntary movements, of the arms particularly, immediately followed Ruloff's suspension; but there was no struggling, no convulsions, no discoloration or distortion of the features, and in fifteen minutes life was extinct. Thirty hours after death, the head was severed from the body, by dividing the neck between the fifth and sixth cervical vertebræ. No examination of the body was had.

•

The Neck.—A dissection of the neck was first made. The mark of the cord around the neck was distinct. There was no



FIG. 1.

ecchymosis in the subcutaneous tissue; but the skin where it had been compressed by the cord had become hardened, and somewhat resembled a narrow strip of parchment. The ver-



FIG. 2.

oræ were all entire, the odontoid process was unbroken, and the transverse ligament was not ruptured.

The Head.—The countenance was pale, no tumefaction of the face. The lens of the right eye was found to be fractured. The brain was removed and weighed, the soft parts dissected away, when the bones of the head were subjected to the process of maceration, and a preparation has since been made.

The Cranium.—The outlines of the cranium are not unsymmetrical. The outer surface is uniform, and presents the usual regular convexity, with the exception of several prominent points. The occipital and two parietal protuberances are unusually large, and the summit in front of the vertex is markedly prominent.

In size, the cranium is much beyond the average, as will be seen by reference to the several measurements hereinafter given. In shape it is more circular than the best-formed cranium. There is great breadth in the posterior and inferior regions. The base is also broad. The general expression which

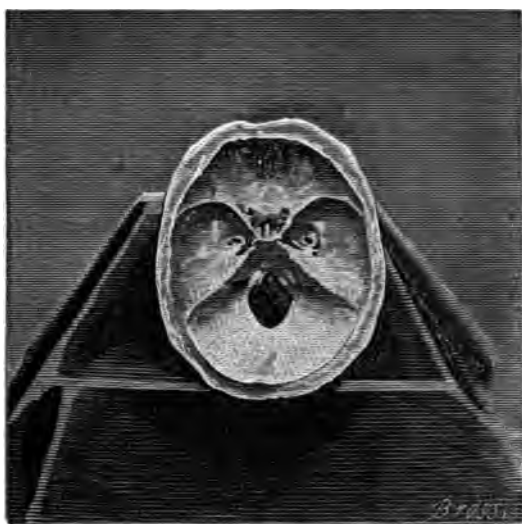


FIG. 3.

the external view gives, is that of a dull, heavy, and somewhat coarse organization. The forehead is not high, and is retreating, although the facial angle is not lessened, owing to the

projecting of the superciliary ridges. On sawing through to remove the calvarium, the unusual thickness of the walls came under notice. The thickest portion is over the left orbit, and measures half an inch in thickness, the thinnest is in the right temporal region, where its thickness is one-quarter of an inch.

The internal surface of the walls of the cranium presents some points of interest. It will be noticed that this surface is not as distinctly indented by the convolutions of the brain as is usual; neither is it as regularly concave or dome-like. That portion which is over the anterior fossa is very thick, and runs down from the groove for the longitudinal sinus in a straight, smooth plane, like the roof of a house.

While the base of the cranium and the inferior portion of its sides are diaphanous, and transmit a certain degree of light, the upper portion is comparatively opaque. This may be regarded as an indication that the lower convolutions and inferior portions of the brain were more active than the superior.

The following are the measurements of the cranium made, following the suggestions of Dr. J. Aitken Meigs,¹ viz.:

1. Occipito-frontal or longitudinal diameter	7 $\frac{1}{4}$ inches
2. Frontal or anterior transverse diameter	5 $\frac{1}{4}$ "
3. Depth of supra-orbital plates	1 $\frac{1}{4}$ "
4. Frontal altitude	2 $\frac{1}{4}$ "
5. Bi-temporal diameter	6 $\frac{1}{4}$ "
6. Parietal altitude, or height of middle lobes	4 $\frac{1}{4}$ "
7. Antero-posterior diameter, or length of middle lobes	2 $\frac{1}{4}$ "
8. Bi-parietal diameter	6 "
9. Posterior transverse diameter	4 $\frac{1}{4}$ "
11. Vertical diameter, or depth of skull	5 $\frac{1}{4}$ "
14. Occipito-frontal arch	15 $\frac{1}{4}$ "
15. Frontal arch	12 $\frac{1}{4}$ "
16. Parietal arch	14 $\frac{1}{4}$ "
17. Occipital arch	11 $\frac{1}{4}$ "
18. Horizontal periphery	22 $\frac{1}{4}$ "
19. Meato-frontal diameter	4 $\frac{1}{4}$ "
20. Meato-parietal diameter	8 $\frac{1}{4}$ "
21. Meato-occipital diameter	4 $\frac{1}{4}$ "

¹ The Mensuration of the Human Skull, by J. Aitken Meigs, M.D., etc., etc. (Reprinted from the North American Medico-Chirurgical Review, September, 1861.) Philadelphia: J. B. Lippincott & Co., 1861.

2. Meato-malar diameter $3\frac{3}{8}$ inches.
3. Meato-alveolar diameter $4\frac{1}{8}$ "
4. Meato-mental diameter 5 "
5. Inter-auricular diameter, or breadth of base $4\frac{1}{8}$ "
6. Position of the foramen magnum :
 - a. From anterior margin of foramen to incisor alveoli.. $3\frac{1}{4}$ "
 - b. From posterior margin to the occiput $1\frac{1}{2}$ "
7. Antero-posterior diameter of the foramen magnum $1\frac{1}{4}$ "
8. Transverse diameter of the foramen magnum..... $1\frac{1}{4}$ "
9. Shape of the foramen magnum.

The size or capacity of the cavity of the cranium has been estimated according to the suggestions of Dr. Meigs, by multiplying certain measurements of different portions of the external cranium together, with the following result :

Anterior fossa.....	$24\frac{1}{2}$	cubic inches.
Middle fossa.....	$54\frac{3}{4}$	" "
Posterior fossa.....	$66\frac{1}{6}$	" "
Total.....	$145\frac{3}{10}$	" "

This, at best, is only an approximation to the actual size of the cavity, and the total seems too large. A careful revision of the calculations discovers no error, and the result is given as above.

A further calculation was made by multiplying the average length, the average breadth, and the average height of the skull together, and the result by this calculation gave, as the size of the cranial cavity, 140 cubic inches.

It must be remembered, however, that these measurements are external, and that, on account of the unusual thickness of the skull (twice, at least, that of ordinary skulls), they would indicate a larger cavity than actually existed.

The entire cavity was subsequently filled with the meal of Indian corn; this was poured out into a square box, and measured 109 cubic inches. This is probably a little below the actual capacity of Ruloff's cranium, as the meal may not have filled up every part of the cavity. In estimating its size at 120 cubic inches, we shall not be far from its true measurement.

The Face.—The outlines of the face are broad and angular, and, but for the projection of the chin, the facial line would be

nearly perpendicular. The zygomatic arches are wide apart; the cheek-bones prominent; the nasal bones short; the upper jaw not projecting, but broad; the lower jaw likewise broad; the chin square and prominent; the rami strong, and standing at nearly a right angle with the base. But for the loss of the molar teeth, the lower jaw would be large and stout. It is likewise deeply indented by the action of its powerful muscles.

The following measurements of the face were made:

25. Naso-alveolar diameter.....	2 $\frac{1}{4}$ inches.
26. Naso-mental diameter, or length of face.....	4 $\frac{1}{4}$ "
27. Bi-zygomatic diameter, or breadth of face.....	5 $\frac{1}{4}$ "
28. Depth of the temporo-zygomatic fossa.....	1 inch.
29. Height of the anterior opening of the orbit.....	1 $\frac{1}{4}$ inches.
30. Breadth " " " ".....	1 $\frac{1}{4}$ "
31. Direction of the transverse axis of the anterior opening of the orbit—the outer extremity inclined downward.	
32. Shape of the anterior opening of the orbit—nearly square.	
33. Inter-orbital diameter, or breadth of nose at the root.....	1 $\frac{1}{4}$ "
34. Distance between the external angular processes.....	4 $\frac{1}{4}$ "
35. Suborbital diameter, or breadth of the superior maxilla....	3 $\frac{1}{4}$ "
36. Length of nose.....	2 $\frac{1}{4}$ "
37. Breadth of nasal orifice.....	1 $\frac{1}{4}$ "
38. Circumference of the upper jaw.....	
39. Circumference of the lower jaw.....	
41. Length of the hard palate.....	1 $\frac{1}{4}$ "
42. Depth " ".....	$\frac{1}{4}$ "
43. Breadth " ".....	1 $\frac{1}{4}$ "

The weight of all the bones of the head is 2 lbs. 8 oz. 1 $\frac{1}{2}$ drs. avoirdupois.

Of the Brain.—The brain was removed from the cranial cavity within thirty-six hours after death. There was no apoplectic extravasation. The convolutions were numerous and very distinct. The entire encephalon weighed fifty-nine ounces avoirdupois.

Weight of the cerebrum.....	50 $\frac{1}{4}$ ounces.
" " cerebellum, pons Varolii, and medulla oblongata	8 $\frac{1}{4}$ "
Relative weight of cerebellum, etc., to cerebrum.....	1 to 7 "

After having been immersed in alcohol for several weeks, the following observations upon the brain were made:

Depth of fissure of Sylvius.....	$\frac{1}{4}$ of an inch.
“ of external layer of vesicular matter or cortical substance.....	$\frac{1}{8}$ “
“ of space between convolutions at vertex.....	$\frac{1}{8}$ “

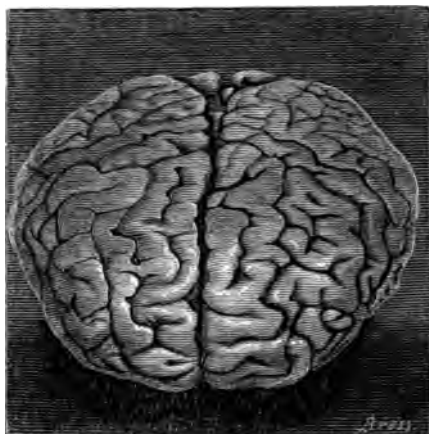


FIG. 4.

The largest development of brain at the cavity of the cranium, and the relative proportions of the mass itself would indicate, was in the posterior and inferior regions. The proportion between the weight of the cerebrum and the remaining divisions of the encephalon was less than the average; or in other words, the relative weight of the cerebellum, pons Varolii, and medulla oblongata, to the cerebrum in Ruloff's brain, was as 1 to 7; while the average proportion, as made out by Prof. Reid, in brains of persons between fifty and sixty years of age, seventeen having been examined, was as 1 to $8\frac{1}{2}$.

The proportion of the weight of the brain to that of the body was as 1 to 46.

In appearance, Ruloff was "a man about five feet eight inches in height. . . . Mouth rather large, with closely-compressed lips; nose small; eyes dark gray, with large pupils and steady; the whole expression of the face concentrated, showing great self-control and power of attention; shoulders broad, chest full, in fact a compact, vigorous frame, small hands and well-shaped arms." ¹ His hair was coarse, standing out from the scalp, and coming low down upon the forehead.

¹ Report of Drs. Gray and Vanderpoel to Governor Hoffman.

His countenance when in repose was stolid and indifferent, when giving vent to his frequent ebullitions of passion, it was repulsive and forbidding; but, when animated by some subject in which he took an interest, like his favorite theme philology, his features assumed an active, lively, and intelligent expression. His voice in ordinary conversation, and when in an undertone, was agreeable; but when speaking, as in addressing the court, which he frequently did during his trial, it was shrill and harsh. In walking he stooped forward, and had a shambling, shuffling gait, such as he would be very likely to acquire during his long confinements in the various prisons in which he had been incarcerated.

His entire organization, as has been remarked of the cranium, was coarse. It was not without vigor or powers of endurance, but its material was not of the best quality, and was wanting in that fine finish which is now regarded as the best development of the human structure. In some respects his organization resembled that deteriorated condition or that low type of *physique* which has been declared by Mr. Bruce Thomson to be characteristic of criminals as a class.

It is extremely difficult to analyze or even to comprehend all the points in the character of Ruloff; there were so many antagonistic features, and so many opposing traits. In fact, he seemed to have possessed two distinct natures. In one he was a pleasant, sprightly, and intelligent gentleman; in the other he was a coarse, violent, and repulsive *brute*. In his better nature, his aspirations were honorable and praiseworthy. He wished, as he not unfrequently expressed himself, to be a gentleman, and respected by his fellow-men. He was ambitious of praise and consideration. In his other phase, he was regardless of all consequences, opinionated, self-willed, and determined in his own way, without the slightest deference to the opinions of others. In the struggles between these two natures, the worse appears generally to have been victorious. This must have been the case at the beginning of his career, so far as it has been made public. A waif upon the tide of human life, he drifted to a remote town in the county of Tompkins—inexperienced, and without fixed plans for the future. He had a taste for literary and scientific pursuits—

wished to be a gentleman, and desired to follow a respectable calling, and so, without much credit to his sagacity or good judgment, he chose to become a *botanic* physician. He married, and commenced practice in that vicinity. As his experience enlarged, and his true position began to be understood by himself, he became dissatisfied, and would have sought a wider and a different sphere of operations. In this, he was opposed by his wife and her family, who doubtless had seen more or less of his bad nature cropping out. Ruloff now began to regard his wife as an obstacle to his plans, an impediment in the way of his success; and soon after, by his own hand, her lifeless body, and probably that of their child, found a resting-place at the bottom of the Cayuga Lake.

In such a fearful manner first openly appeared that prominent propensity in Ruloff's character, which impelled him to remove all obstacles in his way at the sacrifice even of human life, or that induced him, as will be hereinafter claimed, to plunder and steal, in order to promote his favorite plans and undertakings. This was a prominent feature in his character.

Ruloff had a strong mental organization, and many of the operations of his mind were performed with vigor and force. His perceptions were not acute nor active; on the contrary, they were dull, and at times almost stupidly so. In an emergency he was slow to perceive or to appreciate the circumstances surrounding him, and consequently, if pursuit was instituted after any of their depredations, he would be arrested and convicted, as was the case in Dutchess County, in Connecticut, and in New Hampshire, while his associates escaped. The circumstances attending his arrest at Binghamton strikingly illustrate this stupidity of character, if it may be so termed. The murder of Mirrick took place between two and three o'clock on the morning of August 17th. During the ensuing day active and effective measures were taken to capture the perpetrators of the crime. The next night every avenue out of town was strictly guarded by patrols under the direction of the police, the Erie Railway track being one of them. The patrol on this track brought to several persons during the night, and among them a young medical gentleman, then as now a resident of the city of New York, but who, born and

bred in Binghamton, was home on a short visit to his parents; and, on the night in question, returning at a late hour, having been out on an errand not dissimilar to that for which "Leander swam the Hellespont," found himself suddenly surrounded by a body of armed young men, seized by the collar, and ordered to surrender. A very few words of explanation to his old associates and playfellows of course released the doctor. It was before the face of this patrol that Ruloff came shambling along, apparently unsuspecting that any watch or guard would be placed over the thoroughfares of the town. And when released by the coroner, knowing as he did his own participation in the crime, instead of taking measures to elude pursuit in case any circumstance should be brought to light against him, he openly took the railroad-track again, and as a matter of course was easily followed and retaken. A similar unaccountable course of conduct and numerous contradictory explanations characterized him after the disappearance of his wife and child. Whatever intellectual ability may be hereafter claimed for Ruloff, it is certain that he was not an expert in concealing crime, or in eluding the vigilance of officers and detectives.

Ruloff's intellect was of a superior order. It may have been somewhat overrated in the estimation of many, yet I am quite sure his intellectual capacity would compare favorably with the best minds. It was more in abstract pursuits—in metaphysics, in discussing some subtle philosophical proposition, and in certain branches of science—that his mind displayed its vigor, rather than in subjects of a more practical character, or that had reference to the present time. Like every one else, perhaps, his intellect had its range, beyond which it exhibited no remarkable features.

When about sixteen years of age he says of himself he first became interested in the study of languages. From that time, under every circumstance, during his prison-life, and even under sentence of death, it was his favorite and all-absorbing pursuit. The history of the formation and the philosophy of various languages, especially the Greek, were his constant study, and he acquired an extensive and critical knowledge, not only of the Greek and Latin, but also of the more ancient

as well as the modern European tongues. His favorite study, however, was the Greek, and his proficiency and familiarity with this language and its literature excited the surprise and admiration of his better-educated visitors.

While a convict in the Auburn prison, he prepared a criticism "upon parts of Prof. Tayler Lewis's edition of one of Plato's dialogues," which he sent to a gentlemen then, I believe, a member of the Theological Seminary, but who is now a professor in Amherst College. This criticism having been seen by Prof. R. H. Mather, likewise of Amherst College, induced him, while at Binghamton, to seek an interview with Ruloff, which took place the day succeeding his final sentence. The following extract from the published account of the interview, as related by Prof. Mather, is most certainly conclusive as to the attainments and scholarship of Ruloff in the languages:

"The next morning, about nine o'clock, the advocate and I went down to the prison, and the gentlemanly high-sheriff at once consented to the interview, if Ruloff were willing. The doomed man at first refused, as he had done of late to all visitors, but, when told that I was a student and teacher of Greek, he at once consented. He approached the heavy latticed iron door, and asked very politely if I could remain long enough to learn something of the beauties of his theory of language. Without replying, I turned to the officer and asked if I might be permitted to go into the cell. He said yes, and proceeded to unlock the massive padlocks. It was a long, narrow, granite-built room, but high, and furnished with plenty of light and pure air. As we entered, Ruloff approached with two dilapidated chairs, and, with the most winning courtesy, asked us to be seated, and offered to relieve me of my hat. He sat down on his rude pallet opposite me, and I told him that I had seen the criticism referred to above, and that I had desired to learn how he had acquired his knowledge of the old languages. He replied, with a smile, that he had obtained it all by honest work; that he had never been in a college or university, but that from boyhood he had had a most intense interest in the beauty and strength of the Greek tongue. He complained that he had been laughed at

by the public as a superficial scholar, and wanted me to satisfy myself on that, and then hear what he had to say about the formation of language. I replied that as we had no text-books I could not examine him, to which he rejoined that many of the classical authors he knew by heart, and would try and repeat portions if I would suggest where he should begin. Thinking that something from the 'Memorabilia' might be appropriate to his present needs, I suggested the third chapter, first book, where the sentiments of Socrates with reference to God and duty in their purity and exaltation approach so nearly to Biblical revelation; and he at once gave me the Greek. Other parts of the same work, as well as the 'Iliad' of Homer and some of the plays of Sophocles, he showed great familiarity with. Then, in order to show his thoroughness, he criticised the common rendering of certain passages, and he did it with such subtlety, and discrimination, and elegance, as to show that his critical study of these nicer points was more remarkable than his powers of memory; in fact, I should say that subtlety of analysis and of reasoning was the marked characteristic of his mind. On one or two passages of Homer, in particular, he showed great acuteness of criticism, and a most thorough appreciation of the grandeur of the sentiment. One or two renderings of President Felton he opposed most vigorously, and, when I supported the common version, he quoted from a vast range of classics to confirm his view."

Ruloff possessed the power of adapting himself to different pursuits with facility, and of employing his intellect in various ways. While in prison at Auburn he was most of the time engaged in the carpet-shop of J. Barber & Co., "where he was employed," writes Hiram Whiting, Esq., the clerk, "in making patterns and designs for carpets. He was successful in this business, being industrious and ingenious, exhibiting much capacity, tact, and skill."

Ruloff, I believe, had never been admitted to practise in any of our courts, and was not consequently an attorney and counsellor. He, however, was well versed in the law applicable to the trial of criminal cases, in the rules of evidence, etc. On his trial for the murder of Mirrick, he in person

cross-examined many of the witnesses, made objections to the course of the prosecution, and argued his points before the court. In some of the proceedings connected with the disappearance of his wife and child, he appeared without counsel, prepared his papers, made his motions, and argued them with ability and tact. In 1869, under the name of James E. Dalton, he appeared before the Cortland County Court, as counsel for Dexter, who had been arrested and held in jail for stealing silks. He there made an argument in behalf of his associate, and was successful in obtaining his discharge.

His answers to the commissioners sent to examine him, by Governor Hoffman, show extensive thought and a matured mind. He spoke of his reading works on German metaphysics, and his acceptance of the doctrines of Kant and Comte, with the assurance of one who was conscious of his intellectual strength; and he avoided with skill the questions designed to throw doubt upon the opinions he had embraced.

Ruloff's emotional nature was not of the highest order. If he had at any time entertained aspirations for fame and distinction, for an honorable and elevated position in life, he by some passionate outbreak destroyed his opportunities, and disappointed his desires. The circumstances, of which he claimed to have been the victim all his life, are attributable to this cause. He was subject to violent paroxysms of anger, revenge, jealousy, and distrust, before which his judgment and will were powerless. He worshipped no Supreme Being; venerated nothing, unless it may have been an old Greek book, and acknowledged no accountability to a higher power. He was apparently insensible to the consequences of his acts. Never a word of regret or compunction of conscience, so far as is known, escaped his lips. In this respect he verified the observations of Dr. Despine, as quoted by Mr. Bruce Thomson: "In reading," remarks Dr. Despine, "without any preconceived views, the reports of criminal trials, I was struck with the constant recurrence, among those who had committed crimes in cold blood, of a mental condition marked by the absence of all moral remonstrance, before the act premeditated, and the absence, not less complete, of all remorse after the accomplishment thereof." Mr. Thomson makes the

further remark as characteristic of criminals in Scotland: "Besides the absence of moral sense, the want of manly courage, and of confidence in each other, and a habit of universal lying, may be mentioned as characteristic of this class; and nothing affords stronger proof of their moral insensibility, than the fact of their not being amenable to the teachings of chaplains and other instructors."¹

Ruloff would have been a perfect specimen of this class in the hands of Mr. Thomson. He distrusted everybody, and was himself faithless toward all, unless Jarvis be an exception. Under the most solemn circumstances, just before receiving final sentence of death, he filed a lying paper with the court, and, as for any relenting, or sorrow, or desire for religious consolation, he up to the moment of his death strenuously resisted all approaches from the clergy, and would not consent that even a single prayer should be made in his behalf.

His ordinary conversation and mode of expressing himself was of a low order—very profane, and in other respects not choice—yet he could immediately assume the bearing and manners of a cultivated gentleman, with language and expressions of the most finished character.

His will was strong and determined. No better illustration of this feature in his character can be given than his reply to the following question addressed to him by the commissioners:

Question. "Would the fact of another existence, and that existence one of rewards and punishments for your conduct in this life, make any difference to you in regard to your acts?"

Answer. "No; I should do as I intended, without regard to the existence of a God or a devil, a heaven or a hell; I have felt this pride during my whole life. I never wished to get any thing out of anybody."

In his domestic habits Ruloff was amiable, quiet, and retiring, laboriously studious, and as Prof. Leurio, 170 Third Avenue, was the favorite of all the children in the vicinity, for whom he always had a pleasant word, and oftentimes presents of toys, candies, etc.

¹ The JOURNAL OF PSYCHOLOGICAL MEDICINE for January, 1871.

Was Ruloff of Sound Mind?—Much discussion has been excited upon the subject of Ruloff's sanity. So singular had been his conduct, and so remarkable his bearing while under sentence of death, that, in the judgment of many, he could only be regarded as of unsound mind. He himself, however, stoutly resisted every such imputation. When the commissioners appointed by Governor Hoffman to visit him, and to report upon his condition, announced to him the object of their visit, he at once exclaimed: "Gentlemen, this is no work of mine. I do not pretend to be either insane or an idiot. I am feeble in body, as you may see, but this has not affected my mind. The proposal of a commission is no move of mine." To a friend who intimated to him that he thought he (Ruloff) might be a *little cracked* upon the subject of philology, he replied: "Well, I am not half as big a fool as you are for thinking so."

There was no plea of insanity interposed upon his trial; the defence resting upon the supposed inability of the prosecution to connect Ruloff with the perpetrators of the murder. In fact, the circumstances of his arrest, and his subsequent demeanor, would have precluded all expectations of an acquittal. He was arrested, it will be recollected, making his way stealthily out of town in the middle of the night, eluding the vigilance of officers. When questioned as to where he was from, and where he was going, he stated that he had come from Rochester, and had been put off the cars, for want of money, at Union, nine miles west of Binghamton, and was walking to New York City; and, when taken to view the bodies of Jarvis and Dexter, he denied all acquaintance with or knowledge of them. This course indicated a sense of guilt, a consciousness of crime, and a desire to avoid its consequences, which is entirely inconsistent with the irresponsibility of an insane person.

There are, however, many features in Ruloff's case that go to establish the conviction that his mind was not evenly balanced, but that, in many of its operations, it had become disordered and unsound. As the body, by confinement in a single posture for a length of time, becomes distorted and contracted, and loses the power of regaining its former symmetry; so the mind, when long directed to any one pursuit, and when held in

one channel of intense thought, loses its power of true perception; the reasoning powers become subordinate to the one controlling passion or thought, and mental irregularity and unsoundness ensue.

Such, there is reason to believe, has been the condition of Ruloff's mind. In early life he contracted a fondness for the study of ancient languages; this fondness grew into a passion with him, and he surrendered himself to it. Then came distorted visions. In one of his replies to the commissioners, he says: "For over thirty years I have been impressed with the fact that there was something in language that I was to discover." As his mind became more and more intensified upon the subject, the delusion came that he had made his great discovery. That delusion continued. He told Prof. Mather that he "felt convinced that his theory of language was a special revelation to him." He could see nothing anywhere but his favorite theme. "He maintained that all the fictions of Greek and Roman mythology covered some great philological truths."

That Ruloff had the most extravagant expectations of the value of his work, is illustrated by the fact that in 1863, as Prof. Leurio, he attended a convention of philologists, at Poughkeepsie, offered his book for the approval of the members, and demanded five hundred thousand dollars for his discovery and copyright. Mr. E. Jakobs, of 170 Third Avenue, informs me that Ruloff often at home expressed the most sanguine anticipations of the results of his labors, and the large expectations he entertained of pecuniary returns when his work should be completed, and often remarked that he should then be above want.

While awaiting the day of his execution, Ruloff expressed no concern or anxiety as to his own fate; it was the great loss to the world which the failure of his discovery would cause. In this he was earnest and sincere. In an appeal which he made to the Governor but a few days before his execution, he asked a respite, not for himself, but for his book; when that was completed, he expressed a willingness to suffer the penalty of the law. Prof. Mather thus describes this feature in Ruloff: "His enthusiasm is most remarkable. He sat there in his chains, just sentenced by the highest court to die upon the gal-

lows, and, without a word or apparently a thought about his doom, he argued and pleaded for his favorite theory as though he were wrestling for his life, and was determined to win."

He was more or less incoherent on his favorite subject. In a weekly paper, published in Binghamton, he occupied every week at least two columns with the material of his work. In that matter, as published, this incoherency is plainly to be distinguished.

I think that these instances indicate in Ruloff a distorted imagination, false reasoning, and disordered judgment on the subject of his favorite study. In this respect his mind corresponded to that large class of men who run after one idea, and who spend an entire lifetime in following some *ignis fatuus*. Of this class are those who have filled the Patent-Office, at Washington, with useless models; who prospect for mines in the most improbable regions; who embark in enterprises which every one but themselves can see to be foolish; and who, from the continued and increasing disorder of the mental machinery, at length become fit subjects for a lunatic asylum.

The investigation of the commissioners appointed by Governor Hoffman, as appears by their report, was defective in this, that it did not bring out distinctly this peculiar defect of Ruloff's mind. While the examination made apparent his intellectual capacity, exhibited his powers of reasoning, and his adroitness in the discussion of metaphysics, it only alluded to the history of his philological studies, without drawing out in detail his peculiar ideas, or awakening his enthusiasm upon the subject. The examination does not appear to have been intended to discover any latent or concealed mental disorder.

The circumstances under which the commissioners visited Ruloff would be very likely to defeat any such purpose, as he would at once be placed upon his guard. The object of the examination was announced to him. He did not wish to be looked upon as insane. He had rather die the death of a felon, than to have the great discovery of his life—the work that had engrossed his attention for years—regarded only as the production of a disordered mind. The appointment of a commission "was no move of his." He, consequently, would be as

reticent as possible, and his delusions could only be made to appear by skilful questioning, after his confidence had been secured. To Prof. Mather he expressed the belief that his discovery was a special *revelation*; to the commissioners, he only said that he had been impressed with the idea that there was something in language which he was to *discover*. The report does not establish the fact that Ruloff was "entirely sane;" on the contrary, it does reveal indications of mental delusion, quite characteristic of partial insanity.

Ruloff entertained the idea that he was an injured man; that the public had conspired against him; and that he was a victim of public injustice and prejudice. In return, he cordially hated everybody, and was ready to make reprisals on every occasion. He believed it no crime to appropriate other people's property for the furtherance of his great work. To arrest him, even in the act of burglary, was to him an unjustifiable infringement of his personal liberty. I think he fully believed in the position taken on his trial, that the killing of Mirrick was done in self-defence; that Mirrick and Burrows, having first commenced the affray, were aggressors, and, consequently, were not under the full protection of the law.

This distortion of his mind prevented Ruloff from cultivating the higher moral sentiments, or developing his finer emotional nature. Impelled by violent explosions of passion, he was capable of doing any criminal act. Burglary, arson, and murder, would all be resorted to, to carry on his operations, and to remove all obstacles to his success. This state of mind and feelings would very naturally determine to that moral insensibility (which has already been noted), that recklessness of consequences, and that utter *abandon* of all that is good, which seem to have been characteristic of Ruloff. How much the peculiarity of his organization had to do with the mental phenomena he exhibited, or how far it ought to be considered in mitigation of his guilt, it is not yet time to discuss or determine. The tribunal within whose jurisdiction he now is will duly consider, and mete out equal and exact justice to him, for "shall not the Judge of all the earth do right?" The interests of society undoubtedly demanded that his depredations should cease, and, in the judgment of the law, his life was forfeited and taken.

The case of Ruloff will rank with the most celebrated criminal trials of our country, for the peculiar circumstances attending the case, and the great interest it has excited. The trial of Ephraim K. Avery, of Fall River; of Richard P. Robinson, of New York; of John W. Webster, of Boston; and Mrs. Cunningham, of New York; each, in its turn, attracted a large share of public attention and interest, but none more so than did the trial of Edward H. Ruloff.

In presenting the case before this Society, I only desire to place on record the anatomical and other peculiarities of the extraordinary man whose case we have been considering, as a contribution to the general fund of scientific knowledge.

ART. IV.—*Can Chloroform be used to facilitate Robbery?*¹

By STEPHEN ROGERS, M. D., President of the Society, etc.

WITH the introduction of nitrous-oxide gas as a preventive of human suffering during surgical operations; with the demonstration, at a little later period, of a similar and even superior property in sulphuric ether; and with the discovery, almost at the same time, of the still more potent anæsthetic, chloroform, medical science took a long and proud stride in its race in the interests of humanity. Since the announcement of the discovery of the virtues of vaccinia by the immortal Jenner, nothing has filled the world with wonder and admiration like the announcement of the discovery of the anæsthetics by Wells, of Hartford, by Morton, of Boston, and by Simpson, of Edinburgh; and these grand discoveries have ever since furnished themes for historians, sculptors, and poets. Human suffering and hitherto inevitable anguish were, to a vast extent, suddenly abolished, and humanity rejoiced.

It has been said, and I will not venture to say untruly, that the growth of human knowledge does not advance beyond the reach of corresponding developments of the original propensity to sin; hence, with the glories of the discovery of the anæsthetics just mentioned, arose the idea, among the ignorant and

¹ Read before the New York Medico-Legal Society, January 8, 1871.

wicked, that the state of insensibility they produced afforded the most agreeable facility for all manner of unlawful acts which the instincts of self-respect and preservation would oppose. This was more notably the track in which criminal thought travelled, about the time or soon after the introduction of chloroform.

The fact, publicly proclaimed, that there had been discovered a volatile and potent substance of a most agreeable odor, a few breaths of whose subtle vapor would put the strongest man to profound sleep, was seized upon by the criminal mind as the desideratum. But while—as the lethal agents of crimes, upon which the most thrilling newspaper romances were written, and written in considerable numbers—these criminal ideas of the use of narcotic vapors were widely practised upon, their application to the narcotizing of persons, upon whom robbery or other crime was to be committed, was comparatively rarely made, a fact which holds good to the present day.

This disproportion between the cases in which an actual attempt has been made to employ anæsthetics for criminal purposes, more especially chloroform, and the reported cases of such attempts, was long ago quite extensively commented upon by the highest authority, in those days, in the world, at least in England, where this substance was, and since has been, almost exclusively used for surgical purposes. I allude to the late Dr. John Snow, of London, who, early in 1850, or a little more than two years after the discovery of the anæsthetic properties of chloroform, wrote that, “in two recent cases of robbery, it has been asserted that chloroform was used to render the victim insensible; and, although no real evidence has appeared of such having been the fact, yet the statement has gained great publicity through the papers, and even the sentences on the prisoners have apparently been rendered more severe by the allegation.” He further remarks: “It is not difficult to understand how these reports of the criminal use of chloroform first gained currency. The early accounts of the use of this agent in surgery and midwifery, which appeared in all the papers, contained a description of its fruity odor, and its administration on a handkerchief,” nothing being at the same time said of any disagreeable property it might possess,

or of any unpleasant phenomena attending its administration, which would tend to caution against its indiscriminate and unskilled employment. In other words, the romantic aspects of anæsthesia were universally circulated, and its reality allowed to quietly slumber with the medical profession.

Hence, says Dr. Snow, "many persons, as I had experience, entertained the opinion that it might be used for effecting robberies." With this general imperfect acquaintance with the action of chloroform, he thought of the following explanation of some of the alleged cases of robbery while under its influence: It is reported in the papers that a person falls insensible suddenly in the street, and that on coming to himself he thought he recollected something about a handkerchief being applied to his face, and therefore the insensibility, from which he had just recovered, was attributed to chloroform. I quite agree with Dr. Snow in the opinion that, if such a report as this was any thing more than the ingenious invention of the newspaper reporter, it meant to say that the individual in question had taken a fit of syncope or vertigo, the latter, perhaps, of that more permanent variety of dizzy-headedness which is not infrequently met with in convivial persons who sometimes break the silence of the small hours of the night with melodious declarations of intention not to "go home till morning." "These newspaper paragraphs, however," said Dr. Snow, "are very suitable ones for quotation; and, the idea having gained general credence, it is probable that we shall often hear of it from persons who have to account for being in disreputable places and company, and who, being shy of the usual excuse of having dined out, will have a recollection of a handkerchief over their faces."¹ The exactness with which

¹ After this paper had been sent to the editor, the following example of newspaper audacity, in the matter of groundless statements, relating to the use of chloroform in robbery, appeared in one of the evening journals of this city:

"On Saturday night, August 18, 1871, the house No. 115 East Seventy-first Street was entered from the rear-basement window, by breaking out a pane of glass, pushing back the bolt, and raising the sash. From the dining-room a quantity of silver plate was taken, and the plated ware broken up and strewn upon the carpet. The sleeping-room of the proprietor (who was alone in the room) was next entered, the key having been

these early predictions of Dr. Snow have been fulfilled is well known to most of the profession practising since his time, and

turned back with forceps, and chloroform administered to him. His pockets were rifled of one hundred and fifteen dollars in cash; his studs, sleeve-buttons (taken from a shirt he had laid aside for the night), and gold eyeglasses, and also some expensive wearing-apparel of ladies, were stolen. Leaving this room and locking the door behind, with the key on the outside, the thieves next entered the apartment on the next floor in which two young ladies were sleeping, by forcing back the key with forceps. Chloroform was here also used by the robbers, and the occupants robbed of a gold watch and chain, gold bracelets, rings, silk dresses, and money. This room was also relocked, and all the upper chambers were ransacked, the family having been dosed with chloroform. Late Sunday morning the family awoke, all severely suffering from the effect of the drug administered by the thieves."—*Evening Post*, August 22, 1871.

To ascertain what was the truth which had given rise to this editorial or contributed statement, that chloroform had been employed by the thieves, I visited the family living in the house No. 115 East Seventy-first Street, and from them learned that it is untrue; first, that all the family awoke suffering severely on Sunday morning—that, on the contrary, they were all very well, though somewhat puzzled and bewildered at the discovery of their losses, and to find themselves locked in their rooms; and, second, that one of the young ladies above mentioned, being of a highly-nervous temperament, was very unusually agitated and nervous most of the following day—a natural consequence of the alarm and other emotions such a night's exposures, escapes, and losses, would give rise to in a person of such a temperament.

There was but one circumstance alluded to by the family as, in their opinion, possibly indicating that chloroform had been used, and that was the presence of a fine powder or dust upon some articles in the room where the young ladies slept. Under the erroneous impression that chloroform dries leaving a powdery substance upon the surfaces wet with it, this family, and their friends, knowing no better, inferred that said powder or dust indicated that chloroform had been used. Now, as their original proposition, that chloroform dries, leaving a deposit of powder, is untrue, their conclusions have no support, and must be rejected. There is no pretence that even the presence of the powder showed that chloroform was used upon the proprietor of the house, or in his room. Therefore, there is not a vestige of proof that chloroform was employed in this robbery; on the contrary, so far as the newspaper statements may be accepted as correct, those operations of the thieves which were most calculated to arouse the sleeping victims were performed before the alleged administration of the drug.

In short, this case is another and a typical illustration of the thorough unreliability of newspaper reports about the use of chloroform in facilitating robbery.

the experiences of the law-officers, both in his and in other countries, fully attest the clear sagacity of their author. The idea, however, took deep hold of the public mind, and grew into such magnitude that, in 1851, about three years after the introduction of chloroform, the subject of its criminal use became the theme of grave discussion in the British Parliament; Lord Campbell having in that year introduced his "Prevention of Offences Bill," one of whose provisions was the making of "the unlawful administration or application of chloroform and other stupefying agents felonious." The following paragraph from Lord Campbell's speech, in advocacy of the adoption of his bill, will perhaps convey the nearest to a correct idea of the extent to which the public mind in that day had admitted the possibility of the felonious use of these narcotic vapors, especially that of chloroform.

Notwithstanding the published warning of Dr. Snow that the reported cases of criminal employment of chloroform were generally unreliable and totally fictitious, indeed did not furnish a single case of its successful criminal employment, Lord Campbell said: "A most respectable physician has done me the honor to write me a letter, in which he states that the fear arising from the use of chloroform in this way is altogether imaginary; that no strong man who makes resistance can possibly be chloroformed. While I believe that is true of the strong, I think that with those who are not strong, and not able to resist, chloroform could be employed most effectively for facilitating robbery. It has been said that a person thus attacked might refuse to breathe and thus not inhale the vapor, or might turn away his head; but suppose a handkerchief, wet with the substance, is put to his face and held there, the man must breathe. Indeed, it already stands on record that, since the discovery of chloroform, persons have been convicted, before competent courts, of using that article for the purpose of robbery." It is obvious, from the tenor of this address, that even at that time, while the whole subject was comparatively new, Lord Campbell found himself obliged to abandon the idea that chloroform had been or could be used to facilitate robbery, without the knowledge of the person taking it. This abandonment, however, has not been general, but, on the con

trary, the surreptitious application of and unconscious inhalation of the narcotizing vapor of chloroform for criminal purposes is still believed in by a very large number of our people, and the doctrine of its possibility is still far too seriously regarded by our courts.

I have employed chloroform quite extensively for twenty-one years; have administered it to persons of all ages, from a few days to seventy years, to the male and to the female, to the weak and to the strong, to the drunk and to the sober, to the sane and to the insane, to the sleeping and to those awake, and I therefore regard myself as familiar with its action on the human subject in all conditions. This intimate and protracted acquaintance with the subject, a result of a much greater experience than Dr. Snow had when he wrote his papers from which I have quoted, leads me to unhesitatingly indorse his statements which were published more than a score of years ago. "It," says he, "can be readily shown that, were thieves and prostitutes to resort to the use of chloroform in the public streets, in the manner we see alleged, the attempt would only lead to their detection on the spot. The sensation of pungency in the nostrils and throat, that is caused by this vapor when in sufficient quantity to produce any effect on the sensorium, is so great and peculiar that no person can take a single inspiration without being aware that he is inhaling something very unusual. Chloroform, in fact, can never be administered without the consent of the party taking it, unless he be forced to take it, which is the case with children who are not old enough to be reasoned with. If a child be asleep when the process of inhalation is commenced, it nearly always awakes before being made insensible, however gently the vapor may be insinuated."

I will here remark that the real cause of this general disturbance and waking of the person, to whom chloroform is being given during sleep, is not altogether from the pungent impression of the vapor upon the respiratory membrane, but is to be found in the fact that, if it be in sufficient concentration to produce anæsthesia within any ordinary period, it excites temporary closure of the glottis, and arrest of respiration (*Royal Medical and Chirurgical Transactions*, vol. xlvii., p. 329).

This result is almost invariable in its ordinary use, and renders the temporary removal of the sponge or towel from the face, in order to allow respiration to be resumed, and the glottis time to become tolerant, a rule in practice. Of the practical truth of these statements no one can entertain doubt who has been much in the habit of using chloroform upon the human subject, or in experiments upon animals. Place a mouse, or rat, or rabbit, at the bottom of a tub, barrel, or glass jar, and introduce the chloroform vapor. At the first approach of this vapor, which is heavy and falls to the bottom, the animal, whatever may have been its state of torpor before, will at once flee from it, and by every possible means seek to extricate itself from the asphyxiating gas. This system of displacing the atmosphere of the room—in which the proposed victim may be lying—by the heavy vapor of chloroform, has not, as far as I know, often been attempted in criminal practice. I will allude to but two instances in which it is alleged to have been practised with success.

The first case is to the effect that a California hotel-waiter has been accused, tried, and condemned to years of imprisonment for rape committed, as is alleged, under the following circumstances: A waiter-girl at the hotel slept in a small room, and the alleged criminal, having learned from a druggist that chloroform introduced into the room through the key-hole, by means of a spray apparatus, would render the girl insensible, proceeded to practise upon this assurance. It is alleged that she was rendered insensible by that means, and that the crime was committed. An empty bottle, labelled chloroform, found in the accused's room, completed the circumstantial evidence. The totally absurd character of this allegation is apparent to every one instructed and experienced in the use and in the effects of chloroform. We will suppose, by way of illustration, that the occupant of such a room as this girl is said to have slept in may be anesthetized unconsciously, by the vapor of chloroform, thus introduced through the key-hole—though I regard it as impossible. But how is the operator, especially if he be an ignorant hotel-waiter, without the slightest knowledge of chloroform, to know when unconsciousness is effected? How is he to tell

when the victim is ready for the breaking open of the door? Would the most skilled administrator of chloroform venture to fix the moment that the occupant of any given room would be anaesthetized by chloroform thus introduced into it? Would he dare to indicate the time which divides the period of unconsciousness to all outward impressions and violence, or perfect anaesthesia, from that of fatal poisoning from chloroform? Could he tell the moment that it should be discontinued in order to avoid this fatal consequence?

I apprehend that such as could would be difficult to find.

It is therefore obvious that, if this hotel-servant committed the crime alleged, under the circumstances sworn to, it must have been brought about by a most extraordinary combination of accidents, leaving out the question how he himself breathed, and consummated his crime in the same atmosphere, or rather chloroform-vapor, which rendered his victim insensible, and kept her insensible for an indefinite time.

There are other considerations and physiological facts involved in this history, which make it, to my mind, so improbable that I should need much more than circumstantial evidence to convince me that there is a particle of truth in it.

The second case comes to me upon the authority of the late President of this Society, Mr. J. F. Miller, and, though the crime alleged was not effected by chloroforming the human subject, it is interesting, as showing the application of the agent to facilitate robbery. The circumstance is stated as follows: A watch-dog, having been shut up in a small room which contained a safe, was rendered insensible and harmless by throwing towels saturated with chloroform into the room from a high window, and, after thus securing the dog, the safe was robbed. The facts in evidence were the towels, still smelling strongly of chloroform, and the sickness of the dog during all the following day.

While it cannot be questioned that dogs and other animals may, in this manner, be made insensible, there is not the slightest proof that they are ever made so, without an effort to escape from the room in which they are being thus anaesthetized. They are always conscious, and always try to escape, and, were they possessed of the intelligence of the

human subject, always would escape, unless bolted in and beyond the hearing of the people living about them. While, therefore, chloroform may facilitate robbery when given in this manner to watch-dogs, it remains to be shown that it is possible to thus use it on the human subject. Upon the supposition that this was a case of the actual use of chloroform to narcotize a watch-dog, it affords the suggestion that, to prevent such results, very free openings through the floor of such rooms should be provided, so that the vapor of chloroform, which is heavy, might run down like water or carbonic-acid gas, leaving the air of the room uncontaminated. When the vapor of ether may be selected, it, being light, escapes from the upper parts of the room, and must therefore be introduced at the lower part of the room. I have no knowledge, however, that any criminal charges have been laid at the door of sulphuric ether. But all that has been said relative to the pungent, irritating, and suffocating effect of chloroform, is applicable to ether in an eminent degree. Therefore, these being the facts with reference to the vapor of chloroform alone, when introduced into the respiratory track, it may be easily conceived that if to them there be added the towel or handkerchief to the face—the usual method—wet in the cold and very irritating fluid, but few human beings sleep so soundly as not to be wakened by it at the instant, if they were not by the vapor alone.

Most assuredly, if it did not produce that result, no robbers need fear them, for they would not be likely to offer any opposition to even the removal of the clothes from their backs.

I am sustained in these views by much more modern writers than the one quoted.

The London *Lancet* for February of the present year (1871), in its editorial comments upon the newspaper story about a lady who went to her bedroom, and was seized by a man and a lad, who, applying a wet handkerchief to her nose and mouth, and rendering her insensible, completed a robbery, and escaped, leaving the lady to recover from her insensibility, which she did slowly, goes on to state that, although two medical men are stated to have concurred in

the opinion that she had taken chloroform, it is far more likely that the lady in the case simply fainted from terror. The well-founded belief, he thinks, among the best-informed members of the profession, is so completely opposed to all such stories, that they are not to be credited, and he would be glad to see more of them thoroughly sifted, inasmuch as he has never heard of a well-authenticated case of robbery in which chloroform was used; and adds that the common narratives to this effect are often of those people who went into bad company of their own accord, and, having suffered consequences which involve some disclosure, have had recourse to imagination, in order to conceal the truth.

The *American Law Review* for April of the present year (1871) furnishes the following account: "A man and his wife, living in hired apartments in London, induced a jeweller to send one of his shopmen to their apartments, with diamonds of very considerable value for inspection. While pretending to look over the jewels, the woman, it is alleged, went behind the shopman and placed a handkerchief, saturated with chloroform, or some other stupefying agent, over his mouth and nostrils, while the husband seized his arms. As he became senseless, they pinioned him and made off with the jewelry." Upon this history, the editor of the *Times and Gazette*, in the issue for March 18th of this year (1871), remarks that, at the trial, "it was not denied that the shopman who was robbed was first made insensible with some narcotic vapor, administered by inhalation; and hence it is assumed that the felonious administration of narcotic vapors is a possible and a practical offence, against which Lord Campbell endeavored to legislate in 1851. We regret," he adds, "that no determinate inquiry was pursued at this trial, relative to the administration of the alleged narcotic vapor. What was it, and how long was the inhalation continued? Physical force is alleged to have been employed, the male culprit holding the victim while the female administered the vapor. The case differs in this respect from many of the cases of alleged felonious use of chloroform, in which a handkerchief holding the narcotic was thrown over the face. The medical profession have often denied the possibility of producing insensibility by this last nar-

method, while they have admitted that insensibility could, of course, be induced if the person were to be forcibly held. This case presents, if true, the possible fact of felonious administration of a narcotic vapor ; but, if true, we believe it to be the first case of the kind on record, and we beg the public to be reassured on this point, that no volatile substance can be used with felonious intent, unless there be sufficient force present to first pinion, and then rob."

I do not find in the evidence furnished by the report, or by these editorial comments, any reason to accept this as a case in which there was the slightest effort made to resist the felonious assault, and I therefore reject it as the possibly first case.

I find but one well-authenticated case in which the attempt was made in good earnest to render sleep more profound for purposes of theft—as is inferred, though no proof is furnished of such intent. This case occurred in Kendal, England, in the latter part of 1851 (*London Medical Gazette* for November, 1851). The person upon whom this experiment was tried was awoke by a man attempting to suffocate him, as is alleged, by means of a rag steeped in chloroform. In spite of the disadvantage at which he was taken by his midnight assailant, his cries of "Help! murder!" roused the inmates of the hotel at which he was stopping, and, when assistance arrived, the intruder was found the worse off of the two—that is, the most anæsthetized. He, however, was subsequently severely dealt with, according to the report, and an editor of the time suggested that culprits of that class be in future put out of the way of repeating their acts, by forcing them to take a fatal dose of chloroform. It has recently been reported in the newspapers, and I merely repeat it, without vouching for the reliability of the report, that a painter by trade attempted to chloroform the daughter of his employer, in Healdsburg, California, while she was asleep ; but the strangulation awoke her, and she screamed for help. He escaped by scrambling from the window by which he had entered the room, though not early enough to prevent recognition by the girl, upon whose declarations he was subsequently arrested and committed to jail, to await trial on a charge of attempt to administer chloroform, with intent to kill !

The histories of these cases very convincingly show that the felonious use of chloroform, or any similar substance, is a very unsafe proceeding. A more unpromising measure could hardly be thought of by the criminal classes. In speaking of this and other failures of attempts to commit robbery, aided by chloroform, Dr. Snow observes, with obvious justness, that they could hardly have been made by professional thieves, who have the advantage of belonging to gangs, who practise and try beforehand the means they employ, and who certainly would never be led by newspaper stories to use an agent so ill-suited to their purpose as chloroform.

As a matter of instruction to those members of the Society who are not physicians, and therefore are not familiar with the uses and the behavior of chloroform, it may be well to here allude to some of the unpleasant attendants of the administration of this substance, and to some facts which make it an ineligible agent for the use of robbers :

1. As to its use to promote the greater security from the disturbance of the sleeper, even were that practicable, the very time that would be consumed in the gradual and cautious administration of the vapor—the only possible theoretical manner of accomplishing it—would so increase the danger of detection, that few thieves would think of employing it.

2. During the course of the administration of chloroform, whatever manner may be adopted, the patient or subject, as a rule, becomes excited, often very violent and turbulent, with an irrepressible propensity to sing and shout, which is often so loud as to alarm the inmates of a whole house. He is in a state of wild, chloroformic intoxication. The exceptions to this rule are so few, that no prudent thief would think of running the risk of not meeting one of those exceptions.

3. Supposing the two preceding obstacles overcome, and the victim thoroughly quieted into a narcotic sleep, a third and very frequent complication arises. He begins to vomit, and, while he does not generally make much noise about it, still he may, and he always requires attention, lest fatal strangulation occur. It may be presuming too much to credit this class of criminals with any care whether their supposed chloroformed victims die of strangulation or not, but I think

that a common-sense view of the case must lead to the conclusion that, even were chloroform an available agent in facilitating robbery, the knowledge among the criminal classes that the abandonment of their victim with the towel still over his face, and to the liabilities of vomiting and strangulation, would often add the crime of murder to that of robbery, would have great effect in deterring them from the further employment of it.

But, in the absence of the slightest proof that chloroform has ever been given successfully to facilitate the robbery of a person who was already sleeping, and in view of these inherent difficulties in the way of its employment for such purpose, together with the history already adduced of the total failure of the only authentic attempts to thus use it, all cases in which such use of this, or similar substance, is alleged to have occurred, should at once excite suspicion that, either the party making the allegation is laboring under an honest delusion ; is falsifying for the purpose of concealing the fact that he was in disreputable company, or engaged in some shameful act ; or that he is an accomplice of the real robber.

As illustrations tend to fix facts and principles in the mind, I will now adduce the history of a very recent case, to show that the principles above declared, based upon an experience of a score of years, are still as unshaken as they were in the days of Dr. Snow. This case, fortunately, is one of the most instructive, with reference to the above principle, of any which has come under my observation, because it first gives the fictitious chloroform plea, and subsequently the true account, as developed by investigation.

Immediately after the robbery of a large sum of money from a prominent express company, a newspaper report says, the two employés in charge of the office whence the money was taken turned into their bunks, soon after one o'clock in the morning. The double doors were fastened with a bolt merely, which played in sockets fastened to the inner side of the door with nails, and did not reach beyond an inch into the socket of the opposite door. Less than an hour after these two employés went to sleep, according to their own statement, a guard was sent to ascertain the cause of their non-appearance

on their usual duties. He found the doors of the office ajar, and, on entering, discovered these employés sound asleep, and the floor strewn with papers. Failing to rouse the first one he reached, he turned to the other, and, after some vigorous efforts, succeeded in waking him. He then again commenced to work with the other one, and finally roused him from his deep sleep, discovering at the same time a small sponge near his face, which had been used in the administration of chloroform. The supposition was, that the first and most easily roused took it first, and the other, who was much more deeply asleep, took it last, and the robbers left the sponge at his nose. The room was found thoroughly chloroformed, and it was discovered that the bolt in the doors had been strained, and the nails started by pushing from without inward.

When they were thoroughly awakened, it was ascertained that the keys of two safes in the room had been taken from one of their pockets, the safes opened, and the robbery accomplished. The chloroform was so effective that the sufferers still felt the effects on their systems, thirty-six hours after.

This is an account eminently fitted to foster popular impressions upon this subject. Almost any jury would decide that these unfortunate employés had narrowly escaped death, having been wellnigh fatally drugged as well as robbed.

Within a week, however, we are furnished with an account of the other side of the story, which runs in this way: The alleged chloroformed employés after being roused, with the labor described, and seeing a number of weigh-bills scattered around the floor, remarked that they must have been robbed, and though sleeping heavily when found, as soon as roused one of them declared his opinion to be, that they had been chloroformed, and immediately produced a small sponge lying near him, in evidence that such had been the fact.

The bolt fastening the door was found bent in a part which showed that it could not have been done by forcing the door from without.

These facts were soon followed by the discovery that a brother of one of the alleged chloroformed employés had suddenly disappeared from the locality, and subsequently to the discovery that this fugitive brother was in the possession of

several thousand dollars of the stolen money; and almost at the same time the remaining brother, who was the chief of the two alleged chloroformed employés, makes a full confession of having been one of the principals in the robbery. This confession, though said to be full and truthful, is a remarkable mixture of truth and falsehood, such a medley as only one totally ignorant of the physiological effects and the clinical behavior of chloroform would concoct. One, indeed, the principal of these alleged chloroformed employés, stated that, on the night of the robbery, he remained up after his companion was asleep; then, dosing him with chloroform, proceeded to perpetrate the robbery. After accomplishing this, his brother, an outsider, joined him, and took all of the stolen money.

Putting it into his carpet-bag, carefully excluding such packages as were not negotiable, he proceeded to give the remaining thieving brother a dose of chloroform, and then decamped, carpet-bag and all. A more absurd and ill-concerted attempt to employ the chloroform plea to shield from crime has rarely been witnessed. There is not the slightest probability, certainly no proof, that the employé first asleep took any chloroform at all. Why should he? The principal thief, his companion, had the keys of the safe in his pocket, and did not need the use of the anæsthetic to give him easy access to the treasures, and there is no more reason why the thief should have taken the dose he declares he did, when his brother took charge of the carpet-bag of money. It is therefore very manifest that, if any chloroform was taken at all, it was voluntarily taken for appearance' sake, and therefore all who took it were accomplices in the robbery. This is a typical example of the blunders that criminals, who are unacquainted with the matter, will make in their attempts to falsely account for their crimes, by attributing their apparent unconsciousness of them to chloroform, or some similar agent.

There not infrequently come to us accounts of the chloroforming and robbing of families, including perhaps the watchdog. These stories sometimes are related by very honest, and thoroughly-convinced, if not reliable parties.

The present state of knowledge upon this matter authorizes us to presume that in all such cases, though the rooms

occupied by the persons robbed may smell strongly of the substance, and they may even be affected to nausea by it, neither insensibility nor intoxication has been produced by it.

It should be taken for granted that robbery attended by such a circumstance has not been committed by a professional burglar and thief alone, but aided by a novice who is familiar with the habits of the inmates of the house or place, whether such inmates were men or dogs, and probably one who is in the employ and confidence of some party having the means of access to the place, the chloroform having been thrown into the room after the robbery, as a mere cover, and possibly used to disable the dog, if there had been one.

In short, all robberies attended by evidence that chloroform has been in any way or any time used, should be regarded as having been managed by persons in the employ of the parties robbed; but it would be mere presumption to regard the chloroform as having been an efficient agent in the operation, except perhaps to kill or quiet a watch-dog.

All such forgeries are easily detected by consulting experts on the subject, who are generally able to show to the satisfaction of any court that what may at first appear as a plausible and clear case of the felonious use of anæsthetics, is a bare-faced bungle and imposition.

With reference to the use of these agents for unlawful purposes against the will of the person, there are but few authentic cases to adduce as examples, but they also show that the allegations relating to them should not be accepted till the circumstances attending them are carefully sifted. One of the earliest, if not the first case of this kind, I find recorded in the *London Medical Gazette* for November, 1850: A young man returning from a dance, late at night, in company with a young woman, induced her to accompany him into a stable-yard. He there took a bottle of chloroform from his pocket, and poured some on a handkerchief, which he applied to her face. She at once tore the handkerchief away, and called out in such a manner as to bring a policeman to her assistance, and also secured the offender, who is reported to have subsequently soothed and finally subdued the rebellious propensities of this maiden by other influences less anæsthetic, but more agreeable and charming, than villanous chloroform.

The case which occurred at Kendal, England, already referred to, may also be adduced in proof of the difficulty of forcing persons to take chloroform under any circumstances.¹

The two versions of the express-robbery story just given, the one by the thief himself, and the other resulting from subsequent investigation, are probably not more discordant than would be the truth and the manufactured reports of most of the alleged crimes committed under the influence of anæsthetics. Though sufficiently fictitious, some of these reports are even more romantic than this robbery-story. In one of his communications on this subject, Dr. Snow adduces the following highly-imaginative history of alleged felonious use of chloroform, as an illustrative one of this class. It has, besides, the merit of furnishing a key to the motive of many of these alleged offended persons in fabricating these stories :

It appeared, in the evidence before the court, that the offender suddenly passed a handkerchief across the face of the complainant in the street: the two afterward went into a public-house, and were there seen drinking together. After this drinking, the complainant became insensible, and was robbed by the defendant. His insensibility was attributed to chloroform supposed to have been on the handkerchief which was passed suddenly across his face before he went into the public-house to drink (*Medical Gazette*, November, 1850, vol. xlv., p. 327).

This, Dr. Snow very truly remarks, every one at all acquainted with the action of chloroform knows to be an impossible story.

Still more ridiculous are the recent published statements that a certain corner of a prize-ring was provided with a magazine of chloroform, ready to pour its torpefying spray upon

¹ It is said, though I have been unable to obtain the article, that some physician of Baltimore has recently published an advocacy of the doctrine that the forcible administration of chloroform for any purpose, and particularly for criminal purposes, requires a variable amount of force, depending upon the person attacked, thus rendering several accomplices necessary; and also the doctrine that the attempt to administer it to person sleeping would almost certainly awake him. Hence the author regards the use of chloroform for purposes of robbery as mostly ideal.

the luckless pugilist who might be knocked into, or might voluntarily go "to grass" in, his antagonist's portion of the field.

This ingenious bit of fiction may be highly satisfactory to those fellows who are casting about for methods to avoid fighting; and it is more generally acceptable than the plan just adopted of taking one of the bullies to the ring, and leaving the other one at home; but it totally ignores such well-established facts as those of the Kendal case, where a strong man struggles for some time with a weak one, and failed to produce anæsthesia, though the room is said to have smelt strongly of chloroform. A recent distinguished writer in our own country, in treating of the credibility of the hitherto-reported cases of robbery under chloroform, says: "Several remarkable instances of robbery of persons designedly rendered insensible by chloroform have been reported in the newspapers of this country; although they may be authentic, we do not feel warranted in further alluding to them while unable to attribute them to responsible sources. It is obvious that a person may allege that he has been robbed or maltreated after being rendered insensible by chloroform, but also that the allegation may be false, and put forward so as to divert suspicion or awaken sympathy" (Wharton and Stillé, "Medical Jurisprudence," p. 501).

Referring to the case of the jeweller's shopman who alleged that the wife covered his face with a handkerchief, while the husband held his hands, it must be obvious to any one, at all acquainted with the use of chloroform, that the theory of his allegation is preposterous. Would a strong man, determined to save himself from impending suffocation, stand passively and allow a man and a woman to practise the administration of chloroform on him? He could at least have fallen down and turned his head away enough to have enabled him to scream for help, like the man at Kendal, or the young woman in the stable-yard. From all the light which practical experience and the investigation of crimes throw upon this case, there seems little doubt that the shopman was a party to the robbery.

It is at least a very suggestive case, as showing that there is great liability to err on the part of courts in accepting this kind of allegation, unless, upon detailed inquiry into the cir-

cumstances and the manner of the alleged giving of chloroform, they be found consistent with the thoroughly well-known facts and phenomena uniformly attending the administration and the action of this agent.

Any inconsistency such an inquiry might develop should be accepted as indicating honest delusion, studied deception, or a complicity in the crime.

I feel convinced that such a test would exclude at least nineteen in twenty of all these cases of the alleged felonious use of chloroform and similar agents as mere fictions.

But as there may be, as in times past there has been, a popular disposition to accept the statements made by the alleged victims of the felonious use of chloroform, and by their friends, as true, notwithstanding what I may say or other authors may say to the contrary, with the single motive of bringing before the public and the legal profession all that may be true and well authenticated in this matter, I have challenged, and I now repeat it, the production of any proof of the successful use of chloroform on the human subject to facilitate robbery in a single instance. As I have before had occasion to say, when any such proof is furnished me, that robbery has ever been committed by means of the use of chloroform received unconsciously by the person robbed or given forcibly against the resistance of the person robbed, I will be ready to admit it, and this Society will promulgate the fact to the world.

And I cannot conclude these remarks in a more truthful and forcible manner than by adopting the language of Dr. Snow, who so long ago said: "The public have been greatly and unnecessarily alarmed about the employment of chloroform by thieves; what they really have to dread is, that robbers will still resort to the old means of the bludgeon, the pistol, and the knife, and not to one which, like chloroform, allows the victim so good an opportunity of escape, and themselves so great a chance of detection."

ART. V.—*A Case of Progressive Muscular Atrophy, simulating Glosso-labio-laryngeal Paralysis.* By T. M. B. CROSS, M. D., one of the Attending Physicians to the New York State Hospital for Diseases of the Nervous System.

J. M., an unmarried man, twenty-eight years of age, a machinist by occupation, was born in Ireland, and is descended from a very healthy, long-lived stock, in which there is no history of diseases of the nervous system. Naturally a strong, muscular man, he has enjoyed remarkably fine health, and has never been afflicted with any malady whatever, either acute or chronic, nor does he inherit any constitutional taint. When quite young, however, he received a severe fall, by means of which he injured his right shoulder; yet he speedily recovered from the effects of this accident, and has never experienced any inconvenience since that time from this mishap. A little more than a year ago the sight of his right eye was destroyed by an injury.

The first symptom which attracted his attention was a want of clearness and distinctness in his articulation, slight in degree, however, and this was at first only observed after he had exerted himself unduly in talking for even a short space of time. This was in August, 1870. Very soon he began to experience a tickling sensation in the back part of the buccal cavity, as though his uvula were elongated, and after a while he became aware of a very slight nasal resonance in his voice. These symptoms slowly and progressively increased, and about the 15th of December he visited a physician, who, on carefully examining his throat, told him that his uvula descended too far, and ought to be cut off. He submitted to the operation, and for a few days, while the parts were inflamed and swollen, he noticed that he spoke more plainly and with less of the nasal resonance, but gradually, as the wound healed, his articulation was as much affected as before, and by January, 1871, it was more indistinct than ever. Now he commenced to suffer from severe diffused frontal headaches, which would come on every day or two, observing no regular periodicity, and last for several hours. This affection continued for about six weeks, and then disappeared, and has not since returned.

It was at this time that he first began to feel a lack of power in the movements of the tongue, and this was especially marked in the act of mastication, by a slight difficulty experienced in moving the alimentary bolus from side to side. It was not until a few weeks subsequently that he noticed that he was unable to whistle as proficiently as formerly, and this restraint he found was due to a want of power in the lips which did not respond readily to the mandates of the will, while executing the numerous complex movements which are required for the proper performance of this act. Very soon he was conscious of the fact that while talking the air passed freely through his nose, so much so as to greatly annoy him; and he was also aware, as this symptom increased in degree, that his voice correspondingly acquired a stronger nasal accent. Next followed a stiffness about the lips and the angles of the lower jaw, which he compared to the sensations as if the integument in these parts had contracted and was much tighter than natural. At times the lips felt full and hard, but these were merely subjective sensations. Progressively all these phenomena advanced, and it was not till May last that he experienced the feeling of worms in the chin, which only lasted a short time, and was the first appearance of the fibrillary contractions of which he was aware. In June his speech had become very indistinct, and the nasal twang was still more pronounced. At this period he first felt the fibrillary contractions in the left arm. The tongue had now become greatly weakened in its movements, and seemed to the patient to be not only short and hard, but also tied down to the floor of the buccal cavity. The lips, which had at first showed only a slight paresis, as evinced by a lack of facility in the complex act of whistling, were now so much involved that there was difficulty in expectorating, and in pursing them up, while the act of whistling was completely abolished. Such was the history of this patient up to the 3d of July, 1871, when he was admitted into the New York State Hospital for Diseases of the Nervous System, when his condition was as follows:

His articulation was now so much impaired that it was with the greatest difficulty I could understand what he said even by paying the strictest attention. I was obliged to

make him repeat his answers to my questions several times before I could comprehend his reply. He could articulate all the letters of the alphabet, and I noticed that the gutturals were enunciated quite distinctly, being modified, however, by a strong nasal twang; the labials were not uttered clearly, and their pronunciation was attended with much difficulty. The articulation of the linguals was much more defective than that of the labials, while the utterance of the palatals was so imperfect that it was almost impossible to recognize the particular consonants which he attempted to enunciate. The tongue was very small, in fact the smallest that I had ever seen in an adult. On comparing it with the same organ in about twenty different full-grown males, I came to the conclusion that it was diminished in volume at least a third. Not only was it very much decreased in size, but the atrophy of its sides and tip was very apparent. The sides were extremely thin, and the tip, when partially protruded, instead of being semilunar, approximated very nearly to a point. It was also constantly agitated by fibrillary contractions. Its reflex movements were not impaired, although its electric contractility was much affected. He could only extend the apex a very short distance beyond the teeth of the lower jaw. It was impossible for him to either raise the tip so as to press it against the hard palate, or to touch the incisor teeth of the upper jaw when the mouth was partially open; he could not move it from side to side with any degree of vigor. In fact, all its movements were more or less restricted, while some of them were absolutely abolished. When partially protruded, the apex did not deviate to either side, the atrophy having affected both halves equally. The patient has lately experienced some difficulty in swallowing; solids are more readily swallowed than liquids. This trouble of deglutition is perceived at the commencement of the first act of swallowing, and it has gradually increased *pari passu* with the diminution in the volume of the tongue. The larynx rises quickly and naturally, and the pharynx readily grasps the food as soon as the weakened tongue is able to propel it backward. There is no difficulty in chewing on either side, nor does the food lodge between the teeth and the cheeks. It requires an

effort to place the alimentary bolus between the teeth, but there is no disposition for it to remain there. In examining the physiognomy of this patient when his features are in repose, the first thing which strikes the observer is the prominence and fulness of the lips, which have a tendency to remain apart. The lower lip is more or less everted. There is no atrophy in these organs at all. The forehead is smooth, and the rest of the face has a perfectly normal appearance. The naso-labial fissures, it is true, are not well marked, and the right is not as clearly defined as the left, but this we can hardly consider abnormal. When, however, the patient laughs, or the face is thrown into action through the influence of any of the emotions, the angle of the mouth is drawn over to the right side, and a want of antagonism is perceived between the right and the left side of the face, the preponderance being slightly in favor of the right side. There is also an immobility of the whole lower part of the face, and this gives rise to the peculiar feeling of stiffness of which the patient complains, and depends upon a paresis of the muscles in these parts supplied by the facial. The forehead, however, obeys the action of its numerous muscles, and there is no trouble with the orbicularis palpebrarum. The patient cannot whistle; it is extremely difficult for him to expectorate; and in pursing up the lips he is far from expert, yet he can close them without a mental effort, only not as firmly as formerly. The veil of the palate is relaxed, and descends so far that the uvula almost impinges against the base of the tongue, although it has been cut off. The natural arch is not entirely lost, inasmuch as the soft palate is simply relaxed equally on both sides, and consequently the uvula does not deviate, but is merely lowered from its normal position. Irritation of the soft palate not only does not excite reflex movements, but does not even provoke nausea, yet the excitation of the pharynx immediately arouses its appropriate reponse. The tickling sensation in the pharynx still persists, and depends upon the irritation caused by the occasional contact of the uvula with the base of the tongue. There is no regurgitation of either solids or of liquids through the posterior nares, although the velum is relaxed; there is, how

ever, a constant passage of air through the nose whenever the patient makes use of his voice. All the special senses are perfect, if we except the loss of sight in the right eye. His mental faculties are unimpaired. In talking, the patient, to compensate for the loss of air which escapes through his nose, brings into play his abdominal and other accessory respiratory muscles in order to increase its volume so as to be able to speak more plainly. Before doing this, however, he prepares himself by taking a deep inspiration, and while engaged in conversation he contracts as much as possible the muscles of the nose to retain the air. He can blow out a candle, although the volume of air is imperfectly directed. His respiration is deep and normal. There is a loud aortic direct murmur at the base of the heart. His pulse is 70, full and strong. His tongue is clean, his bowels are regular, his urine is natural, and his appetite is excellent. Fibrillary contractions, which were present in the left arm only when he first came under our observation, have extended since then, and up to this date, September 1st, have attacked in order the left shoulder, the right arm, and lastly, the right shoulder. There is no appreciable atrophy to be discovered in any part of the body excepting the tongue. The left hand is much weakened in its movements. The dynamometer shows a greater disparity between the muscular power of the right and the left hand than the normal difference between these two sides. This is perceived by the patient himself, and he often remarks, "My left arm is growing weaker." For some time he has experienced much inconvenience from a lack of dexterity in performing nice manipulations with the fingers of the left hand, which his occupation required him to do, and which he formerly had no difficulty in accomplishing. There is no perceptible atrophy of the hands or the arms; the fibrillary contractions are never completely absent in the arms. Reflex movements are here normal, and so is the electric contractility. He has never had any neuralgic pains. In fact, the disease is in such an early stage in these parts that no other changes have yet made their appearance. The pupil in the left eye is normal, and the retinal vessels are perfectly natural. His general health is good; he sleeps well,

and complains of no head-symptoms whatever. He has never had any choking sensation or cough since the affection commenced, nor has the saliva ever dropped from his mouth. He has lately spoken of a feeling of dryness in the mouth and pharynx, but on carefully examining these parts I could discover nothing which would indicate any such abnormality. His larynx is not involved, nor are his vocal chords at all affected. He attends to his daily avocations, and seems quite cheerful and happy. He hopes to recover, thinking that his youth and vigorous constitution are greatly in his favor.

The treatment has consisted in the internal administration of the nitrate of silver, together with the application of the primary galvanic current to the head, to the sympathetic nerve, and to the affected muscles. The induced or faradaic current has been applied to the tongue and to the veil of the palate. These applications were made three times a week, and up to this time the disease has steadily progressed; although his articulation is more distinct than it was two months ago, yet I fear this amelioration is only temporary, for the affection is surely advancing.

The only cranial nerves involved in this case are the two hypoglossal and the two facial; all the others are unaffected. On the one hand, we have the destruction of the trophic cells in the medulla oblongata, which preside over the nutrition of the muscles of the tongue, and in proportion to the loss of which we have weakening of that organ; and, on the other, we have impairment of the motor cells at the origin of the facial, which produces a paresis corresponding in degree to the number of cells involved in the disease. These two different conditions conjointly give rise to the symptoms which have just been described, and which are merely an expression of the degree of implication of the nuclei from which these nerves take their origin. The cause of the disappearance of these cells is undoubtedly sclerosis. It is quite probable, from the history of this case, that the atrophy was the initial symptom, although I freely admit it had never been noticed until the patient came under our observation.

The points upon which I base the diagnosis that this is a case of progressive muscular atrophy are as follows: The dis-

ease commenced in the tongue, there has been a gradual loss of power in this organ in proportion to the amount of atrophy; the affection has extended to other parts, and is now present in both upper extremities; there is an absence of some of the symptoms which ought to be present at this stage in glosso-labio-laryngeal paralysis, if this were a complicated case. These facts, in connection with the others in the history, seem to me to prove that this is one of those rare cases of progressive muscular atrophy commencing in the tongue which are rarely met with in practice. It will also be observed that there was no known predisposing or exciting cause discovered excepting age and sex, and this is not uncommonly the case in this disease. Passing now to symptoms, I will briefly explain the most prominent of these: The changes in the trophic cells of the hypoglossal nerves account for the restraint in the movements of the tongue, the great impediment experienced in the enunciation of the linguals, and the difficulty of swallowing, which depended solely on the inability of the tongue to send back the food readily within the grasp of the pharyngeal constrictors, from atrophy of its muscular fibre. The nasal resonance of the voice, the tickling sensation in the pharynx, the great trouble experienced in articulating the palatals, and the passage of air through the nose, all result from the paralysis of the veil of the soft palate which receives its motor influence from the great and small superficial petrosal nerves, which are branches of the facial given off from the ganglion in the aquæductus Fallopii, the former passing to Meckel's ganglion, and thence distributed to the levator palati and azagos uvula muscles, and the latter going to the otic ganglion, and from it sending branches to the tensor palati and tensor tympani muscles. The absence of nausea and the abolition of reflex excitability on reaching the soft palate are due to the implication of the motor cells in the nuclei of the facial, which are so much impaired as to be unable to take cognizance of the stimulus which is duly received from the fifth pair, and send out in accordance there with the appropriate motor response. Passing to the facial nerves, we observe the paresis of the orbicularis oris and of the lower part of the face, which is more marked on the left side when thrown into

action, while the buccinator, the orbicularis palpebrarum, the digastric, the stylohyoid, etc., are unaffected. From this we learn that the motor cells are only partially involved at the origin of the facial nerves. Again, the embarrassment in speech arises from three factors, namely, the weakened tongue, the paresis of the lips, and the paralysis of the soft palate; these, conjointly reacting upon each other, are the cause of all the difficulty in articulation, and are the result of the changes which I have already described as taking place in the nuclei of the hypoglossal and facial nerves. The diminution in the electric contractility of the tongue is directly caused by the loss of its muscular fibre, while the fibrillary contractions which are the precursors of atrophy, together with the loss of power and the lack of dexterity in performing nice manipulations with the left hand, show very plainly that the disease has already invaded the cervical enlargement.

ART. VI.—*Fatal Reflex Paralysis from a Slight Flesh-wound of the Neck.* By BENJAMIN HOWARD, M. D., of New York, late Professor of Clinical and Operative Surgery, etc.

LIEUTENANT P., Twenty-second New York Volunteers, was wounded at the second battle of Bull Run, and was found two days afterward, where he fell.

He stated he was wounded in the neck, fell, and had not since been able to move. On examination, a wound was found, less than half an inch in depth, and about an inch in length, running transversely across the anterior margin of the left sterno-cleido-mastoideus, opposite the cricoid cartilage, and apparently completely anterior to the course of the phrenic nerve. No other wound or contusion could be found. The patient's mind was clear, and he complained of nothing except total inability of motion, which was found to exist from the site of the wound downward.

Owing to the nature of the circumstances, no notes could be taken on successive days, but I afterward learned that on the ninth day after receiving the wound he died in an ambu-

lance *en route* to Washington. This seems to have been one of those rare instances in which shock to one of the sympathetic branches produces, through its connections with the spinal system, paralysis more or less complete at all points below.

CONTEMPORARY LITERATURE.

MR. MIVART'S volume on the "Genesis of Species,"¹ was published before that of Mr. Darwin on the "Descent of Man," but it is really a reply to the views put forth by Mr. Darwin, there and elsewhere, with regard to natural selection, and its application to the intricate problem concerning the origin of different kinds of plants and animals. Mr. Mivart begins by reviewing the theory of natural selection, as stated by Mr. Darwin, summing it up in the following apothegms:

"Every kind of animal and plant tends to increase in numbers in a geometrical progression.

"Every kind of animal and plant transmits a general likeness, with individual differences, to its offspring.

"Every individual may present minute variations of any kind and in any direction.

"Past time has been practically infinite.

"Every individual has to endure a very severe struggle for existence, owing to the tendency to geometrical increase of all kinds of animals and plants, while the total animal and vegetable population (man and his agency excepted) remains almost stationary."

Mr. Mivart admits the great value of this theory to science in helping us to explain and understand and coördinate a whole series of important facts, and he acknowledges the debt that science owes to Mr. Darwin and his fellow-laborers. But the great point wherein he differs from Mr. Darwin is, in regarding natural selection alone as insufficient to account for any considerable number of important phenomena connected with the origin of species; while, according to Mr. Darwin, it is sufficient to account for all. Mr. Mivart specifies his objections as follows: asserting—

"That natural selection is incompetent to account for the incipient stages of useful structures.

¹ On the Genesis of Species. By St. George Mivart, F. R. S. New York: D. Appleton & Co. 1871.

"That it does not harmonize with the coexistence of closely-similar structures of diverse origin.

"That there are grounds for thinking that specific differences may be developed suddenly instead of gradually.

"That the opinion that species have definite though very different limits to their variability is still tenable.

"That certain fossil transitional forms are absent, which might have been expected to be present.

"That some facts of geographical distribution supplement other difficulties.

"That the objection drawn from the physiological difference between 'species' and 'races' still exists unrefuted.

"That there are many remarkable phenomena in organic forms upon which natural selection throws no light whatever, but the explanations of which, if they could be attained, might throw light upon specific origination."

Natural selection, Mr. Mivart maintains, utterly fails to account for the minute and rudimentary beginnings of useful structures, which, while in process of formation, are of no use whatever, but sometimes even the reverse. Many of the changes attributed by Mr. Darwin to this influence, as, for instance, the elongation of the neck of the giraffe, are shown to be based on very doubtful reasoning. If the giraffe, in reaching after lofty foliage, had been able to preserve itself at the expense of many other races of animals, it is a question whether the additional strength and increased size of frame, necessitated by the length of neck and legs, would not more than counterbalance, in times of scarcity, the increased facility for obtaining food. Again, it is argued if this was the sole reason why the giraffe attained its altitude, how does it happen that the same influence did not cause an elongation of neck and legs in many other animals similarly situated and quite as much in need of food? Many instances are given, by the author, of incipient structures in various animals, which it seems impossible to account for on the hypothesis of natural selection, inasmuch as they are not of a character to favor the preservation or advancement of the animal. It appears much more difficult to imagine the development of perfect organs from such accidental irregularities, as roughness of skin, etc., than to suppose the presence of an internal law effecting the evolution of new specific forms, modified in its action, among other influences, by natural selection. Mr. Mivart deems it absolutely incredible that the mammary gland should have had its origin in the accidental drop of nourishment obtained by some young animal from an acciden-

tally hypertrophied cutaneous gland of its mother. Equally incredible does it appear that the marvellously complex structure of the eye and ear in the higher animals could have been produced by infinitesimal beginnings, because it would suppose a multitude of variations in different parts, long continued in a given direction, and yet utterly useless until all the variations had reached a given point. An ingenious calculator has reckoned that the chances of the occurrence of such a series of variations are as one to a number "about ten thousand times as great as the number of waves of light that have fallen on the earth since historical time began."

Another difficulty presents itself in regard to the many variations which subserve no useful purpose whatever, such as the adaptation of the ear to appreciate beautiful and intricate music. Indeed, the author admits that, the more deeply he considers the subject, the more profoundly he is impressed with the inadequacy of Mr. Darwin's theory. "In spite of all the resources of a fertile imagination, the Darwinian, pure and simple, is reduced to the assertion of a paradox as great as any he opposes. In the place of the mere assertion of our ignorance as to the way these phenomena have been produced, he brings forward, as their explanation, a cause which it is contended in this work is demonstrably insufficient."

The coexistence of closely-similar structures of diverse origin is adduced as another argument against the assumption that all forms and structures have been built up by indefinite and fortuitous variations in every part and in all directions. The chances are evidently against the accidental occurrence of two similar series of variations, yet there exist countless examples of similar functional results being attained by means the most diverse. The number of possible variations is so great that it is practically impossible for two exactly-similar structures to have been independently developed. That such correspondences do exist, and that in abundance, is clearly shown by reference to animals of every class. In the fish and the cephalopod both the eye and ear are evolved with complete independence. The most striking instances given by the author are those of the highest organs of sense as independently developed in the vertebrates on the one hand and the mollusks on the other. Another singular instance is that of placental reproduction, which always exists in the mammalia, does not exist in any bird or reptile, does exist in certain sharks, and, strange to say, reappears again in one of the most lowly creatures, the ascidians, or sea-squirts. But we cannot even allude to the many cases in point brought forward by the author, who has evidently spared no labor on this por-

tion of his argument, which leads him to the conclusion that "natural selection has not been the exclusive or predominant cause of the various organic peculiarities." Such is certainly the legitimate deduction from the facts as he states them.

A very interesting chapter treats of minute and gradual modifications, and much attention is paid to the marked changes which animals and plants undergo under the influence of climate. These changes cannot be attributed to natural selection, nor are they by any means minute. Dogs and cats, transported to a great distance from England, undergo decided changes, even in the second generation. The same has been observed of horses, pigs, rabbits, and other animals, and of many vegetables. We have an instance of this change in the deterioration which Cuban tobacco undergoes in the second generation when grown in Connecticut. The imported seed yields a crop of superior tobacco, but, in order to maintain the quality, it is necessary to renew the imported seed each successive year. Still more remarkable changes sometimes occur, and it seems proven that in both the animal and vegetable kingdoms deformities and monstrosities are capable of indefinitely producing their like, though such is rather the exception than the rule. Mr. Mivart, however, finds in these *sudden* variations a strong argument against the mode of change necessary for the theories of Mr. Darwin. He finds, too, that the changes are not always from a lower to a higher form of being, but sometimes the reverse. He believes on this ground that *racés* may have thus fortuitously arisen; but the weight of the argument is in favor of the relative stability of species, "at least in the intervals of their comparatively rapid successive manifestations."

In regard to geology, the author says, "The mass of paleontological evidence is indeed overwhelmingly against minute and gradual modification." Vast numbers of perfectly similar specimens are found, while there are only two or three relics of the forms as they were undergoing transmutation. There is abundant evidence, too, on the Egyptian monuments, of the stability of certain animals. If it is contended that an almost indefinite period of time is required by the Darwinian theory, it can reasonably be objected that physics and astronomy do not warrant the assumption of time enough for all that those theories require. The absence or extreme rarity of fossils in the oldest rocks is also a point at present inexplicable. "All these difficulties are avoided if we admit that new forms of animal life of all degrees of complexity appear from time to time with comparative suddenness, being evolved according to laws in part depending on surrounding conditions, in part internal."

Other obstacles to the Darwinian hypothesis are found in the geographical distribution of animals, the same species being found in various and very remote parts of the globe. These facts accord with the doctrine of evolution much better than with that of gradual change.

One chapter is given to the definition and consideration of homologies. The use made of this in the argument rests upon the assumed internal power regulating the anatomical formation, determining symmetry of the various parts, and directing the development. If this law can be conceived as sufficient to mould each organic being, and account for specific identity, it may also account for specific divergence.

The bearing of natural selection on moral conceptions is critically and carefully discussed. Mr. Darwin's opinion that the idea of right is merely a result of experience—a perfected habit—is rejected as insufficient and illogical, and at variance with the law determining the “survival of the fittest.” Duty and interest are too opposite to warrant the assumptions of Mr. Darwin. Natural selection alone could not have produced a higher morality than was useful, nor an abhorrence of what was sinful and impure. Moral conceptions are found all over the world, and in some low form even among the lowest savages. This seems to the author to militate against the theory of natural selection, but to accord with the idea of “orderly evolution and successive manifestation of specific forms by ordinary natural law.”

Mr. Mivart next attacks the “provisional hypothesis” of Pangenesis, which assumes the existence of an almost infinite number of gemmules in each individual. Each atom or gemmule has the power of reproducing its like, circulates freely about the organism which is made up of such particles, and is derived from all the parts of the ancestors of the organism. This is really one of the least reasonable suggestions of Mr. Darwin, and viewed critically amounts to about the same thing as a spiritual second self, on which the visible material is moulded. It has the disadvantage also of being entirely based on the imagination, and seems hardly worthy of the labor bestowed by the author on the demonstration of its absurdity. It is shown to be nearly on a par with atoms, molecules, and particles, dreamed of by mediæval and later writers, among whom Buffon almost anticipated the doctrine of Pangenesis. It must be remembered, however, that the doctrine is advanced only as a provisional one, and that it has no necessary connection with the weightier matter of natural selection. But it is very clearly shown that there are very grave difficulties in the way of the reception of this theory, and it is equally clear that, if established, it would only add to the mystery of the origin of individual organisms.

It is only after a full and critical review of Mr. Darwin's views, that the author urges his own as more in accordance with facts and observations. The sum of his theory is the assumption of an internal force or tendency which coöperates with and modifies the action of external conditions. This internal power is, however, superior to all other influences, that of material selection included. "It is quite conceivable," he says, "that the material organic world may be so constituted that the simultaneous action upon it of all known forces, mechanical, physical, chemical, magnetic, terrestrial, and cosmical, together with other as yet unknown forces which probably exist, may result in changes which are harmonious and symmetrical. Thus also monstrous aberrations from typical structure might correspond to a discord, and sterility from crossing be compared with the darkness resulting from the interference of waves of light."

This internal power is supposed to preside over the actions of every part of every individual. It is assumed that by such a force, from time to time, "new species are manifested by ordinary generation," and that thus, with comparative suddenness, considerable changes have been effected. Herein lies the grand difference between the views of Mr. Mivart and those of Mr. Darwin. The former believes that species arose, as it were, by jumps; the latter believes the changes have all been effected by gradual and almost imperceptible steps.

The closing chapter of Mr. Mivart's work deals with the bearings of the Darwinian theory, and his own theory of evolution, on Christian belief. He begins by rebuking two classes of zealous partisans—those who identify orthodoxy with their own narrow and prejudiced views, and those who, being hostile to religion, gladly seize any and every argument against it. It is shown that "evolution" does not mean a denial of divine action or a negation of the providence of God. It is merely another way of regarding His agency. There is, indeed, it is shown, no reason whatever why a Christian thinker may not accept the general evolution theory. Extensive quotations are given from ancient and venerable theological authorities in proof of the harmony between the most orthodox theology and the most modern teachings of science in regard to the theory of evolution. Nor need there be, in the author's opinion, any difficulty on the part of Christians in accepting the doctrine of science concerning the creation of man. On the other hand, it is contended that the doctrines of Christianity present nothing that a rational, logical, and scientific mind should feel called upon to reject because of its inconsistency with the teachings of the physical world. "The Christian system," says the author, "is one that puts upon the

strain every faculty of man's nature, and the intellect is not exempted from taking part in the probationary trial." There are many mysteries in natural as well as in revealed religion, and the conclusion to which the author's arguments tend is, that, since we *cannot* escape the one, we *ought* not to escape the other.

PROF. HAMMOND does not claim for his work, on "Diseases of the Nervous System,"¹ that it is a complete or exhaustive treatise, but he does claim that it is sufficiently complete for all practical purposes, as a guide to the general practitioner, and that it embodies mainly his own observations, opinions, and experience. Hence we find no lengthy prefatory history of the diseases in question, no vain repetition of ancient or superseded theories, and no startling speculations reaching beyond our present knowledge. The treatment of the subject is eminently practical throughout. The introductory chapter consists of a brief description, with illustrations of the various instruments and appliances necessary in the diagnosis and treatment of nervous disorders, their mode of action, and the manner of using them. Then follow the five sections which compose the greater part of the volume. The first section treats of diseases of the brain, including insanity. The second section is devoted to diseases of the spinal cord; the third to cerebro-spinal diseases; the fourth to diseases of the nerve-cells; and the fifth to diseases of the peripheral nerves.

The instruments employed in diagnosis are few and mostly simple, consisting of the ophthalmoscope, the cephalohæmometer, the æsthesiometer, the thermometer, the dynamometer for measuring strength, and the dynamograph for determining muscular tone and coördination. The electrical apparatus, which plays so important a part in the management of nervous disorders, includes instruments for furnishing both the primary or galvanic, and the induced or faradaic currents.

The first section, on diseases of the brain, begins with the consideration of cerebral congestion, active and passive, and the means of distinguishing this condition from cerebral anæmia, epilepsy, and other affections, having many symptoms in common with it. Among the therapeutic measures employed by the author for diminishing the quantity of blood in the brain, we find special prominence given to the

¹ A Treatise on Diseases of the Nervous System, by William A. Hammond, M. D., Professor of Diseases of the Mind and Nervous System, and of Clinical Medicine, in the Bellevue Hospital Medical College, Physician-in-chief to the New York State Hospital for Diseases of the Nervous System, etc. With Forty-five Illustrations. New York: D. Appleton & Co. 1871.

stimulation, by the galvanic current, of the sympathetic nerve. Of the available internal remedies, the bromide of potassium or sodium is the most efficient. In the treatment of the opposite condition of cerebral anæmia, the bromides may do much harm, and the chief reliance must be placed on alcohol and nutrients. Hence the great importance, which is insisted on, of making a careful and discriminating diagnosis. Under the head of cerebral hæmorrhage the author includes apoplexy in its various degrees and forms. The precursory symptoms of extravasation into the substance of the brain or its ventricles are fully described, and the insidious modes of attack are dwelt upon at considerable length. Some interesting statistics, as to the age at which cerebral hæmorrhage is most likely to occur, are given from the author's notes. Of two hundred and twenty-nine cases, two hundred and four occurred in persons over forty years of age. "Of these, one hundred and seventy-two were between forty and sixty, twenty-four between sixty and seventy, five between seventy and eighty, and three over eighty. Of the twenty-five cases in persons under forty, seventeen were between thirty and forty, seven between twenty and thirty, and one under twenty." The disease is said to be certainly more common among men than women, though other authors have been led to hold the contrary opinion. The treatment of cerebral hæmorrhage is necessarily directed chiefly to the prodromatic stage. Here, again, the bromides of potassium and sodium are highly esteemed by the author, who has also found the bromide of lithium of great value, partly on account of the rapidity with which it acts. Of the treatment during the seizure, the author says: "During an attack, and throughout the whole period of reparation of damages, the less that is done in the vast majority of cases the better. The question of the propriety of bloodletting will generally even yet arise, but should in nearly every case be decided in the negative. . . . I have never bled a patient for cerebral hæmorrhage since 1849, and I am very sure that I have had no reason to regret the abandonment of the practice. The management of the subsequent paralysis, which calls for great skill and perseverance, depends chiefly on the judicious employment of electricity and strychnia." Abstracts of sixteen well-marked cases are given. The treatment of meningeal hæmorrhage is essentially the same as that of cerebral hæmorrhage; but in the peculiar form of the disease known as hæmatoma of the dura mater it is believed that no treatment will be of permanent avail. The same remarks, with slight modification, apply to the efficacy of therapeutic measures in thrombosis and embolism.

The chapter on cerebral softening is full and exhaustive, containing the results of a large experience of that disease, with many original observations concerning its causes, pathology, and management. In his remarks on treatment the author enters an emphatic protest against the use of powerful counter-irritants, and especially the actual cautery.

The subject of aphasia is one to which, it is well known, the author has paid special attention for many years. Hence we find his remarks on that disease particularly interesting and instructive; but the disorder has so many and such curious phases that it would be impossible to do the author justice in any abstract of his views. It is satisfactory to note, however, that very beneficial results followed, in many cases, the treatment pursued, which generally consisted of the judicious use of tonic and stimulant remedies, particularly electricity.

Acute and chronic cerebral meningitis are disposed of rather briefly. Attention is directed to the existence of cerebral rheumatism, and the manner of distinguishing it from other forms of cerebral disease. In the treatment of acute meningitis, general bloodletting and mercurialization are recommended, together with full doses of the bromides. The chronic form of the disease requires a different course, and the very active treatment sometimes adopted is considered worse than useless. Even where the disease is non-syphilitic, the author advises the use of bichloride of mercury and iodide of potassium, combined with supporting and stimulant measures, as wine and highly-nutritious food. Not much is said of the treatment of tubercular meningitis, beyond a warning against blisters, leeches, and drastic purgatives. The chief reliance must be placed on prophylactic measures and abundant nutrition.

Suppurative encephalitis is another disease of which the prognosis is almost invariably unfavorable. The symptoms may be controlled somewhat by appropriate remedies, but the treatment is altogether palliative. Here, again, stress is laid on the evil effects of bloodletting, antimony, and other measures which depress and exhaust the system, while tonics, Indian hemp, and the bromides, may be of some service. There is difficulty in the diagnosis of this disorder, and in its earlier stages it is sometimes impossible to distinguish it from other affections having like symptoms. Still more difficult is the diagnosis of diffused cerebral sclerosis. A number of cases are given in illustration, but when recognized the prognosis is gloomy. The convulsions and paralysis may be treated with some chance of relieving the patient, but the author is unable to say that he has ever been able actually to remove the supposed sclerosis. A separate chapter is given

to multiple cerebral sclerosis, detailing very fully its characteristic symptoms. It is a disease essentially progressive, but some of the cases described have evidently been decidedly improved by appropriate treatment, and much of the attendant suffering relieved.

Tumors of the brain are divided into vascular, parasitic, diathetic, tuberculous, syphilitic, and accidental. Unless a syphilitic taint exists, little can be accomplished by medication, but the author thinks it advisable to administer mercury and iodide of potassium, on the presumption that there is a specific complication. The medicine recommended can do no harm, and may do good. The induced galvanic current is of positive benefit in awakening the paralyzed muscles and restoring the tone of the system. Counter-irritation is condemned as useless, especially the more powerful means, as the actual cautery.

The chapter on insanity is necessarily brief, but presents a clear outline of the prominent features of that disease, or rather symptom of disease, for as such it is considered by the author, whose definition of it is as follows: "A manifestation of disease of the brain, characterized by a general or partial derangement of one or more faculties of the mind, and in which, while consciousness is not abolished, mental freedom is perverted, weakened, or destroyed." It is admitted, however, that it is very difficult to give a definition of insanity that is entirely sufficient or satisfactory, and, by way of illustration, the various definitions of eminent authorities are quoted and their defects pointed out. By mind, the author understands "a force developed by nervous action, and especially by the action of the brain." The modifications of this force, outside the limits of health, constitute insanity. These modifications may be due to one or more of many causes. The mind Prof. Hammond regards as a compound force of which the elements are perception, intellect, emotion, and will. On this basis he forms his classification of disordered mental action, which is the following:

I. Perceptual insanity, characterized by the tendency to the formation of erroneous perceptions, either from false impressions of real objects (illusions), or from no external excitation whatever (hallucinations).

II. Intellectual insanity, characterized by the existence of delusions.

III. Emotional insanity, characterized by the uncontrolled or imperfectly-controlled predominance of one or more of the emotions.

IV. Volitional insanity, in which there is an inability to exert the full will-power either affirmatively or negatively.

V. Mania, characterized by the union of two or all four of these forms in the same individual.

VI. General paralysis, a peculiar form of insanity, attended with progressively-advancing loss of mental or motor power.

VII. Idiocy and dementia; the first due to the fact that there are original structural defects in the brain; the second resulting from the supervention of organic changes in a brain originally of normal power.

A brief description is given of the chief features and peculiarities of each of the forms of mental aberration, accompanied by several woodcuts, illustrating typical cases.

Among the causes of insanity, hereditary tendency is believed to be the most powerful. There is not much difference in regard to the liability of the sexes, though somewhat greater in the male than in the female. The disease is most likely to manifest itself between the ages of twenty-five and forty-five. The author does not share the common opinion that mental exertion is a fruitful source of brain-disease, unless it is too monotonous, or carried so far as to cause privation of sleep; but, he says, "continual thinking on one subject is the most effectual way of producing insanity by the action of the brain."

The treatment must be governed by the fact that insanity is the result of a material disease, and is not, as was long believed, a metaphysical nonentity. Where the ophthalmoscope reveals hyperæmia of the brain, the treatment should be that recommended in cerebral congestion or hæmorrhage. The bromide of lithium is spoken of very highly as a means of depleting the cerebral vessels and calming excitement in cases of acute mania. It should be given in doses of sixty grains, or even more, repeated every two or three hours until sleep is induced. In cases where mania is absent, the other bromides are found to answer the purpose. Counter-irritants are condemned, and of general bloodletting the author says, "it will calm a highly-maniacal patient, but so will a sufficiently severe blow on the head." Hydrate of chloral is regarded as a dangerous remedy. In a word, tonics, stimulants, and kind treatment, are the chief means relied on by the author for the cure or palliation of mental disorders. He disapproves, on general principles, of the crowding together of lunatics in large asylums, where each one associates only with others similarly affected; but he bears testimony, from extensive personal observation, to the superiority of American asylums over those of Great Britain and the Continent.

The second section treats of diseases of the spinal cord. Active and passive congestion of the cord are considered together. The most common causes of these congestions are exposure to cold, and the influence of fevers of malarial origin. Their differential diagnosis

is somewhat difficult, but, in simple cases, the prognosis is not unfavorable. In the treatment of acute cases, local bloodletting is recommended, and the administration of ergot of rye in large doses (one drachm of the fluid extract three times a day). The peculiar action of ergot, in relieving congestion of the capillaries, was first demonstrated by the author, who published his discovery as early as 1861. Recent experience has confirmed his opinion of the value of this remedy in the treatment of congestive diseases of the spinal cord, but its good effects are obtained only by using it in large doses. Belladonna, the hot douche, and electricity, are also among the agents that have proved valuable, while strychnia and phosphorus are invariably contraindicated, and "irreparable damage may be done by their use."

The interesting subject of spinal anæmia, or what is commonly known as "spinal irritation," is very fully discussed, and the necessity of a careful diagnosis is insisted upon, since the disease is liable to be confounded with myelitis, meningitis, or congestion, of which the treatment is diametrically opposite. Spinal irritation requires a treatment essentially tonic, including the direct galvanic current. A number of typical cases are related in detail, and the results obtained show the disorder to be comparatively tractable under judicious management, provided, of course, that it be not due to obstruction of the aorta, or the occlusion of the spinal vessels by emboli. Spinal hæmorrhage and spinal meningeal hæmorrhage have almost always a fatal termination, and run their course with great rapidity. In these diseases, nothing can be done beyond enjoining perfect rest and keeping ice applied to the vertebral column. Spinal meningitis is also generally fatal, though it may be occasionally arrested by active measures tending to deplete the inflamed membranes. Ergot is not generally admissible, and strychnia is never indicated.

Acute myelitis differs so much from chronic myelitis, that the two diseases are considered separately. The diagnostic points of difference are well marked, but, as far as results are concerned, both forms of the disease imply lesions that it is beyond the power of the practitioner to repair. The utmost that can usually be accomplished is to render the patient as comfortable as possible, under a disease that appears to be inevitably progressive.

The course of sclerosis of the antero-lateral columns of the spinal cord is also progressive, as a rule, though much less rapidly so than that of myelitis. The ordinary duration of the disease is set down by the author at from two to five years. The symptoms vary with the part of the cord affected, the primary symptom being loss of muscular

power. Reflex movements, on the contrary, are generally exalted, and electro-muscular contractility is usually increased. The gait is peculiar, and to the experienced eye strikingly characteristic. "The prognosis is always grave; and, sooner or later, a fatal termination usually takes place. Still, great ameliorations are possible, and a cure is not impossible." It is certainly a little encouraging to find, at least, one organic spinal disease which it is "not impossible" to cure, for, as a rule, they seem to baffle the resources of the therapist. The indications in this disorder are to diminish the amount of blood in the cord and its meninges. The author, therefore, prescribes large doses of ergot, and, at a later period, depends on nitrate of silver, cod-liver oil, and the primary galvanic current. Hydropathic treatment in this affection he does not approve, and even the Turkish bath does harm; nor has he found the slightest benefit from the use of counter-irritants.

The next disease in order is locomotor ataxia, which the author, in accordance with his plan of designating diseases by their lesions, describes under the head of "sclerosis of the posterior columns of the cord." The initial symptoms of this serious disorder are somewhat vague, and its progress is generally slow. Care is sometimes necessary, to avoid confounding the symptoms with those proper to lesions of the cerebellum. The prognosis is gloomy, though decided amelioration may often be expected, and even a temporary arrest of the disease. The treatment recommended includes ergot, bromide of potassium, cod-liver oil, and electricity. For the acute pains, the author gives the preference to codeine.

Tumors of the cord are difficult of diagnosis, and, unless of syphilitic origin, nothing can be done for the patient by medication, or any other means. It is always advisable, however, to give the case the benefit of anti-syphilitic remedies, in the hope that they may prove appropriate.

The chapter on secondary degenerations of the spinal cord is mainly a condensation, the author informs us, of M. Bouchard's treatise on the same subject, with the addition of a few cases of his own, and some remarks on the advantages he has obtained in these diseases from the application of the galvanic current to the cord, and the induced current to the atrophied muscles.

The consideration of diseases of the spinal cord is brought to a close by a comprehensive chapter on tetanus, in which are embodied, in addition to the author's personal experience and opinions, the observations of several distinguished authorities, and the results of various treatment. Much importance is attached by the author to the

application of ice to the spine, which, he thinks, should form a part of the treatment in all cases. He also speaks favorably of *cannabis Indica*, as a means of controlling the spasms. Of nine cases that came under his immediate care, there were three recoveries—an experience exceptionally favorable. The author does not agree with those who think this disease due to blood-poisoning, but believes “we are warranted in concluding that tetanus essentially consists in a morbid exaltation of the functions of the spinal cord as a nerve-centre.”

Cerebro-spinal diseases form the subject of Section III., of which the first chapter treats of hydrophobia, giving a *résumé* of its symptoms, causes, and treatment. The author has seen four cases of the disease, all of which proved fatal in three days or less. He has performed excision in six cases where the patients had been bitten by dogs certainly rabid, with the effect in all of preventing the development of hydrophobia. He does not believe that any treatment has ever arrested the disease, when it was once fully developed. The results of some imperfect trials of the galvanic current, however, render it desirable that more thorough experiments should be made with that agent in such cases.

The interest of the chapter on epilepsy lies chiefly in the details of treatment, for there is no doubt that certain forms of epilepsy are susceptible of cure, and many forms of some measure of relief. In regard to the supervention of intellectual debility or derangement in protracted cases, the author says: “The most important ascertained point is that the mild paroxysms, unattended by convulsions, are more productive of mental decay than the severe form of seizure. The occurrence of the first attack late in life is likewise a predisponent to dementia.”

The treatment that has been found most beneficial, in the majority of the cases treated by the author, includes the use of the bromides, of oxide of zinc, and of the primary galvanic current; and the best results have been obtained where these remedies were used conjointly. Out of two hundred and eighty-six cases cited, seventy-four are reported cured, by which it is understood that six months have passed, after discontinuing medicine, without a paroxysm. The author recommends the induction as soon as possible of the cachexia peculiar to the use of the bromides, being fully convinced that it never causes any permanent ill effects, and that it often brings about such a change in the whole organism as to render epilepsy no longer possible.

In the treatment of catalepsy also the author depends on the bromides, sometimes combined with tonics or with the oxide of zinc. He believes the prognosis of this disease to be usually favorable, even in

severe cases, and, by a judicious use of the remedies mentioned, he has never failed to cure a case. The bromide has not been given in larger quantities than one drachm a day, or continued longer than eight months. Ecstasy differs from catalepsy in several points, but the two diseases may coexist. In the former, the patient recollects the train of thought which took place during the seizure, which is not the case in the latter. The treatment is essentially the same, special pains being taken to bring a favorable moral influence to bear on the ecstatic, and remove all associations likely to foster morbid thoughts.

Of chorea, the author remarks that "diseases which are almost certain to terminate fatally, and those which ordinarily recover without medical treatment, are very sure to have a great many medicines used in their therapeutics." Chorea belonging to the latter class has been made the subject of a great variety of treatment. Prof. Hammond believes that much may be done toward shortening the duration of the disease, and preventing it from assuming a chronic form. He depends on strychnia, given in gradually-increasing doses, until the physiological effects of the medicine are obtained, when the original dose is repeated, and again increased gradually as before. If, in addition to this, proper attention is paid to hygienic measures, the most satisfactory results may be confidently expected.

Hysteria is classed provisionally under the cerebro-spinal diseases, since many of its symptoms point to disorder of the brain and spinal cord, though as yet we are in total ignorance of the lesions indicated by those symptoms. The author defines hysteria as the predominance of the emotions over the intellect, and especially over the will. The question of treatment is necessarily a broad one, and involves so much besides mere medication, that it is impossible to reduce it to any definite rules. As medicines, the author has found none superior to phosphorus and strychnia, taken in small doses and long continued.

The disease known as multiple cerebro-spinal sclerosis is the co-existence of sclerosis affecting the brain and cord, as treated of under their respective heads. The prognosis is generally unfavorable, and the treatment demands chiefly galvanism, chloride of barium, and hyoscyamus, which must be perseveringly employed, often for many months.

The last disease considered in this section of the work is athetosis, an affection not hitherto described by other writers, and of which only two cases have come under the author's notice. "It is mainly characterized by an inability to retain the fingers and toes in any position in which they may be placed, and by their continual motion." The two

cases are given in detail, with illustrations, from photographs, of the curious positions assumed.

The fourth section is devoted to the discussion of diseases "due to degeneration and atrophy of the cells in intimate relation with nerve-roots, and which immediately preside over the functions of the nerves arising from them." Under this section we find a brief but clear account of progressive muscular atrophy, of glosso-labio-laryngeal paralysis, of organic infantile paralysis, and of the several forms of paralysis agitans.

The fifth and last section of the work deals with diseases of the peripheral nerves, which for convenience of classification are broadly divided by the author into four groups, viz., paralysis, spasm, anæsthesia, and hyperæsthesia.

The first, second, and third groups include facial paralysis, facial spasm, torticollis, anæsthesia of cutaneous nerves, and anæsthesia of the fifth pair. The various forms of neuralgia are included in the fourth class. The treatment recommended is both constitutional—special and general—and local. The author is of opinion that, unless there is some physical cause interfering with the integrity of the nerves, neuralgia is "almost invariably induced by a depressed state of the system." Special remedies are employed where there is a syphilitic, rheumatic, malarial, or gouty diathesis. In cases due to malarial poisons, arsenic has often proved useful where quinine had failed. But, whether there be specific complications or not, general tonics are always indicated, especially cod-liver oil, iron, strychnia, and ergot, with a full and nutritious diet. Chief among the local means of treatment is the primary galvanic current. Blisters also are recommended, and the local application of aconite or veratria, in the form of ointment or tincture; and the use of ether or chloroform during the paroxysm. Section or excision of a portion of the affected nerve, in view of results hitherto obtained by such operations, is deemed unwarrantable; but the author has several times employed acupuncture and electropuncture with success.

The author has the happy faculty of expressing himself in clear and unmistakable English, and the style of the work is such as to render it intelligible and interesting to a large number of readers outside of the medical profession.

In these lectures, Dr. West¹ gives us his experience regarding the peculiarities of disorders of the nervous system during infancy and

¹ On Some Disorders of the Nervous System in Childhood. Lumbian Lectures for 1871, by Charles West, M. D. London: Longmans, Green & Co., 1871. Philadelphia: Henry C. Lea.

childhood. These he considers with reference to—1. Sensation ; 2. Motion ; 3. Power of speech ; 4. Mental and moral powers.

Among the more striking facts advanced by the author, the following may be briefly noted : "That pain in any part during early life signifies, almost without exception, that disease of some sort is going on there, or near at hand." Pain in the head or in one of the lower limbs, often regarded as neuralgic, almost invariably betokens organic disease of the brain in the one instance, of the hip-joint in the other. Convulsions in childhood generally depend on eccentric causes. As a consequence or symptom of brain-disease, they do not occur until such disease has reached an advanced stage. In cases of tubercular hydrocephalus, convulsions are usually unilateral, frequently confined to one arm, and almost always followed by partial paralysis of the affected side. Partial convulsive movements have a tendency to become general, when they are for the most part violent, attended by unconsciousness, and by such general disturbance of the nervous power, that, in spite of their usually short duration, death not unfrequently takes place during the paroxysm. When they have a tendency to recur without exciting cause, they take the name of epilepsy. The convulsions of infancy owe, in part, their importance to the danger of the child becoming epileptic. Epilepsy in childhood blunts the intellect and weakens the moral power, more than in the adult. At the same time, if the attacks cease, recovery takes place with surprising rapidity. The increased frequency of chorea in girls is unaccounted for by the influence of the sexual system at puberty, as the same disproportion exists in children under ten years of age. In sixty-six cases, rheumatism existed in sixteen instances ; and in nine others, though there were no rheumatic symptoms or history, the heart was the seat of valvular disease. In certain cases West suggests that the heart-disease may have been the consequence, not the cause, of chorea. Emotional causes are uncommon. The mental faculties only suffer temporary impairment. West knows of no instance where the mind did not eventually regain its balance. In paralytic conditions following diphtheria, the patient should be spared every form of muscular exertion. A paralysis of short duration is not uncommon in childhood, following epileptic seizures, or left behind after an attack of chorea, or noticeable after a long illness. West sticks to the old title of infantile paralysis, in place of Duchenne's "*paralysie atrophique musculaire graisseuse*," as the latter appellation predicates in all cases what is only true in some ; and, even when it does occur, does not take place at a definite time, nor bear any uniform relation to the loss of power. *Absolute* recovery

from infantile paralysis, even in the most favorable cases, is comparatively rare. Anxious parents of backward children may be confidently reassured, as, sooner or later, almost every child not deaf will talk. Stammering is an infirmity which comes with self-consciousness, with mental culture, and a highly-wrought nervous system. West never knew a child to stammer before the commencing of the second dentition (?). In chorea, it seems sometimes as if not only the power of articulation, but the memory of words, were for a time gone. In loss of speech following fever, recovery may be certainly promised. West has seen but one case of true aphasia obviously connected with a cerebral affection, and that in a child five years old. The remarks on mental and moral peculiarities are interesting (as, indeed, almost every thing is that comes from Dr. West's pen), but not calling for special notice.

This little book, though it does not contain any thing especially new, presents in a convenient and attractive form a body of information which is, after all, none too familiar to most medical men. To those who have to deal with children, the work will well repay careful perusal.

WE now add another volume to the interesting subject of electricity,¹ which has been prepared by Drs. Beard and Rockwell, and is intended as a complete, practical digest, on all that appertains to the application of this agent to the treatment of disease. Within a short period the American profession has had the literature of this subject much enriched by the addition of two excellent books; and the present volume, though differing in its plan from that of either Meyer or Althaus, is not the less valuable on that account. The authors have dwelt with sufficient fulness on the history and physics of the subject, and have especially considered the methods of application. The clinical part of the work is good, and the volume, as a whole, is one which is creditable to them. We do not, of course, wish to be understood as indorsing all the views held by Drs. Beard and Rockwell, and we especially protest against their practice of general electrization. At the same time, we commend their treatise as one which contains a large amount of valuable matter, and as being by far the best original

¹ A Practical Treatise on the Medical and Surgical Uses of Electricity, including Localized and General Electrization. By George M. Beard, A. M., M. D., Fellow of the New York Academy of Medicine, Member of the New York County Medical Society; and A. D. Rockwell, A. M., M. D., Fellow of the New York Academy of Medicine, Member of the New York County Medical Society. With One Hundred and Two Illustrations. New York: William Wood & Co., 61 Walker Street, 1871. 12mo, pp. 698.

American work on the subject of which it treats. It is written in good English, and has evidently been prepared with care.

The late hour at which the volume was received precludes a more extended notice.

THE volume on "The Eye in Health and Disease,"¹ by Dr. B. Joy Jeffries, which has recently been published, is based on a series of articles which he contributed to a journal for the express purpose of instructing the laity in regard to the care of the eye. These original articles have received many additions, and are now presented to the public and the profession for the first time in book form. The book is written in a clear and simple style, and would, no doubt, fulfil every requirement of a first-course medical student, or that portion of the non-professional world which thirsts after medical lore, while, for the use of the profession, it is evidently not intended, except it be for those who are just commencing the study of the eye, and who desire to obtain a superficial view of the anatomy, physiology, and medical and surgical treatment of that organ, in the small compass of one hundred and nineteen pages.

CHRONICLE.

I.

PHYSIOLOGY AND PATHOLOGY OF THE BRAIN AND NERVOUS SYSTEM.

1.—SCHÖBL. *The Membrane of the Bat's Wing, especially the Termination of its Nerves.* (Archiv für microscopische Anatomie, vii., 1-31.)

THE fact, that this membrane in the bat is endowed with an extraordinarily delicate sensibility, has been long recognized. This was most clearly shown in the many-times-repeated experiments by Spallanzani, of blinding the animals. Dr. Schöbl repeated the same, with

¹ The Eye in Health and Disease; being a Series of Articles on the Anatomy and Physiology of the Human Eye, and its Surgical and Medical Treatment. By B. Joy Jeffries, A. M., M. D., Fellow of the Massachusetts Medical Society, Member of the American Ophthalmological Society, Ophthalmic Surgeon to the Massachusetts Charitable Eye and Ear Infirmary, Ophthalmic Surgeon to the Carney Hospital, Lecturer on Optical Phenomena and the Eye at Harvard University, etc. Boston: Alexander Moore, Lee & Shepard. New York: Lee, Shepard & Dillingham, 1871. 8vo, pp. 119.

the modification, however, that, instead of blinding the animals, he carefully closed the eyes with adhesive plaster. The extremely careful microscopic analysis of the organ in question, aided by all the methods of modern histology, gave the following results:

The outer membrane consists of a simple layer of slightly-pigmented, beautiful hexagonal disks, which are blended into a continuous free membrane at their thin edges. The stratum Malpighii consists of two simple layers of cells, of which the upper is pigmented, the lower pigmentless. The stroma of the membrane consists of an undulated connective tissue, strewed with numerous connective corpuscles. Embedded in this are found elastic bands, striped muscles, blood-vessels, hair-bulbs, and their dependent glands, nerves and their terminations. We will confine our description to the nerves and their mode of termination. The entire nerves of the wing-membrane may be naturally divided, according to their position, into five layers, of which one, embedded in the middle stratum of the stroma of the membrane, is simple, the others lying double, on each side of the first, and respectively approach the two surfaces.

The first contains the largest nerve-trunks, which accurately follow the course of the largest blood-vessels.

The second contains nerve-trunks of from six to forty fibres, which generally accompany medium and delicate blood-vessels. On the largest trunks simple dichotomous branches occur, but the formation of broad, irregular meshes is the rule.

The third lies on a plane with the finest blood-vessels and the capillary net-work: its nerve-trunks are generally composed of but two, more rarely of four pale nerve-fibres. The expansion and net-work of these are the same as in the second.

The fourth lies immediately over the net-work of capillary vessels, and is composed entirely of an irregular net-work of single pale nerve-fibres; the net-work is here formed by an immediate anastomosis of the single pale fibres.

At the nodulated points are found usually three-cornered, four-cornered, or many-cornered, moderately decided enlargements of a delicate granular appearance, in which, however, the author could not discover any nuclei. Similarly, spindle-shaped enlargements are found pretty often in the course of the single nerve-fibres.

The fifth and last nervous layer, with the terminal ends, lies immediately over the fourth on the surface of the cutis between the deepest cells of the rete Malpighii, usually remaining adherent to the cutis after removal of the epidermis. The nerve-fibres of this layer are also pale, and have a diameter of from 0.0009 to a fineness beyond measurement. They are composed of the pale nerve-fibres of the former layer by the subdivision of the finest fibres of the same, and form equally an irregular net-work, at the nodulated points of which, the enlargements occur only exceptionally, and then are very minute; the spindle-shaped enlargements in the course of the single fibres are also wanting. Besides this mode of ending of the nerve-fibres in the terminal net-work, there occurs in this membrane still a second; a portion of the nerve-fibres ends in terminal corpuscles. These latter have the shape

of a short pine-cone, with a somewhat rounded point (breadth 0.0175 mm., length 0.0259). They lie surrounded by the transparent membrane of the hair-follicles under each hair, and their number and arrangement correspond therefore exactly with those of the hairs. The nucleus of this terminal corpuscle is formed of cells which from their origin belong to the Malpighian layer; the borders are formed of closely-woven, dark-edged nerve-fibres which proceed from the second nervous layer, by each one of the finest nerve-trunks (of four to six fibres) of the latter, passing to each one of the hair-follicles, and thereby forming coils, and, by surrounding the cell-projections of the follicular layer, compose the terminal corpuscles. Generally the nerve-trunklet divides, before reaching the terminal corpuscle, and one half the fibres pass to one side, and the other half to the other side of the latter.

As regards the significance of the two modes of termination of the sensitive nerves of the membrane, the assumption is very evident that the terminal corpuscles, because of their analogy with other organs of touch, their regular subdivision, and their connection with the hairs, produce the exceedingly delicate sense of touch of the membrane, while the pale terminal net-work affects the sensibility to temperature, pain, etc.

2.—*Examination into the Exciting Process in the Nervous and Muscular System.* (Prof. J. BERNSTEIN, Heidelberg, Winter, 1871, Psychiatr. Cbl., No. 5, 1871.)

We give only the conclusions reached by the author of this highly-interesting and laborious investigation, in brief, and refer, for a more exact comprehension of the same, to the work itself.

Proceeding from the excitability of the nerve-fibres, the author dissects the process of the occurrence of irritability in the nervous and muscular fibres with the help of the negative fluctuation (which it is well known consists in that, by the irritation to which these organs are subjected, the abducted nerve or muscular current suffers a diminution, which is called negative fluctuation), and comes to the result for both organs, that the excitement is transmitted in them in an undulatory form called waves of irritation; a wave which in the nerve-fibres has a length of 18 mm., and a duration of 0.00065', on an average, and in one second passes over 28 metres; and those in the muscular fibres a length of about 10 mm., a duration of 0.004', and a rapidity of from 3 to 4 metres in the second. The waves of irritation in muscles and nerves present differences, not only in regard to their absolute value, in length, duration, and rapidity, but also as regards their behavior in transmission.

It is, according to the author, of first importance for the process of excitement of both organs, that the waves of irritation of the nerve-fibres in course of transmission do not change essentially in size, and thus retain the same intensity, while the waves of irritation in the muscular fibres constantly decrease in height as they leave the irritated locality. As the author regards the waves of irritation as the sign of a molecular movement occurring in the interior of the

fibres, he places the vital force of this movement on an equality with the intensity of the irritation. In the nerve-fibres the irritation consists of a molecular movement only; there occurs in it no transformation of molecular movement into a movement of the mass, and on this ground the waves of irritation, as long as they move there, lose none of their original strength.

In the muscular fibre, on the other hand, the originally-developed molecular movement of the waves of irritation does not remain as such; it appears in the movement *en masse*, and the heat in which the work of the muscles consists. The source of this work is the vital power of the wave, out of which the muscular fibre derives the action visible to our eyes.

On this ground the height of the wave of irritation decreases with transmission into the muscular fibre, and the loss which the waves of irritation experience in vital power is transformed into the work which the muscular fibres perform.

The law of irritation is common to the nerve and muscular fibre. For the muscles it can be experimentally proved that the intensity of the excitation is a function of the wave of irritation, and that the excitation is dependent on the rapidity with which the wave of irritation changes in height.

And here the author calls attention to the similarity which exists between the law of excitation asserted by Du Bois-Raymond, through the electric current, and the above-announced law. The author further turns his attention to the process of excitation in the nerve-centres, to which by sensitive passages excitations are brought, and from which by motor passages excitations pass out. As for the centres of sensibility he comes to the belief that they oppose an obstacle to the transmission of the excitation, so that the excitation reaching a central element diffuses itself broadly over the neighboring central elements, until the excitation has reached the limits of its undulating capacity. As the excitation within a nerve-fibre loses nothing in vital force, it therefore follows that it can find in it no obstacle; the centres must act otherwise. The author vindicates the property of the ganglionic cells to annihilate the vital force of the wave of irritation, and he sees in this property the existence of sensibility; for, did the excitation pass by the ganglion-cells without losing in intensity, then no sensation would be accomplished. Therefore we judge of the greatness of a sensation by the number of ganglion-cells whose combined action was needful to destroy the vital force of an excitation. Hence the author explains the irradiation, and, while he regards as proportional the resistance of the intensity of the excitation itself, he comes to a theoretical deduction from the psycho-physical law, which Fechner had already announced, but which the author confirmed more exactly, and which runs: "The greatness of the sensibility is proportionate to the excitation divided by the undulating capacity." This formula is distinguished from that of Fechner by this, that by this construction the specific resistance also of the central elements which are permeated by the excitation is taken into account. This correction of the formula of Fechner seemed called for, for the reason that two individuals, after

one and the same irritation, may react in a very different grade, and even in the same individual an unusual response to the irritation may follow through some morbid disposition, which phenomena the author explains through the specific resistance of the central elements. Supported by his declared theory, the author reaches also a solution of the sensitive circuit of the skin.

Two neighboring points of the skin, when irritated, appear as one point as soon as the two diffusions of the excitation coincide in the centre to a certain limit, which he fixes mathematically. Where this is the case, the excitations are added together in such a manner that, at the middle point between the irritated spots, a maximum of excitation occurs, to which the point of irritation is transferred.

It is thus explained that the coalescing of both irritations into one must remain constant, if the two points of the compasses are shifted at equal distances within a uniformly-constituted portion of skin. Furthermore, the author declares that the strength of the pressure has no influence upon the extent of the circle of sensibility. He confirms his theory by an experiment. By a single irritation the excitation attains to a maximum in the central point to which it reaches, and we fix the locality of the irritation by this maximum.

If, however, the two irritated points are so near that their excitations fall partly one over the other in the centre, but still are separately felt, through the added excitation, two maxima occur, which lie nearer together than the irritated points.

The location of these maxima may be fixed by calculation, and, in fact, this calculation corresponds with the results of the experiment. As regards the experiment presented in the last sections of the work in question, on the passage of excitation in the motor nerve-centres of the heart, the reader is referred to the original.

3.—*Experimental Researches into the Peripheric and Central Nervous System.* GUDDEN. (Arch. für psych. ü. nerv. Krh., vol. ii., Lib. 3, Psychiatr. Cbl., No. 5, 1871.)

The experiments of Dr. Gudden attempt not alone, like other physiological experiments in resection, to study the immediate consequences of the removal of portions of the brain. While seeking to retain in life, as long as possible, animals with a growing brain, after removal of a portion of the cerebral substance, Gudden attempts to find the cause of the solidarity of the growth, which may be deduced from the connection between several portions of the brain, and thereby asserts a new correction to the views of the anatomical relations. The work, which shows at the same time a richness of thought and a clearness of views, possesses a special interest in its novel experimental physiological grounds.

The method of investigation adopted consists in experimenting on young animals (rabbits of one to two days old, or pigeons of twelve to eighteen hours old). By way of technical alleviations thereby produced, Dr. G. calls attention to the lessened sensibility, the retarded bleeding, through the rapidity of the flow, and the extremely prompt instinct toward recovery, which makes it possible accurately to fix the limits of the injury.

By peripheric division of the nerves, the reuniting of the peripheric portion in the surface-wound was prevented by displacement and cicatrization. In the removal of brain-matter, the sutures were used as lines of separation in the cranial opening, in the manner of Charnier, in order to bring together the separated plates of bone on the three sides, and thus to close and cause their union. Death followed generally after seven or eight weeks, from injection of prussic acid.

The first experiment applied to the organs of smell. Gudden precedes it with a stringent and independent description of the olfactory plates at the ganglion, behind which he describes a secondary ganglion. He regards the olfactory plates as an independent centre of sensation, whose medulla, forming the *tractus olfactorius*, according to the results of resection, shows no solidarity with the medulla of the *pedunculus olfactorius* and anterior commissure. Still, on account of the extension of the medullary fibres of the bulb, through the cortex of the *pedunculus*, the medulla of the latter is not to be separated anatomically. In the anterior commissure he finds no cross-fibres between the *pedunculus olfactorius* and the hemispheres.

The results of the operations are :

1. Artificial closure of the nasal orifice produces a backwardness of the development of the olfactory nerves, of the bulb and *tractus olfactorius*, which is announced by a quantitative repression of the elements, without qualitative changes.

2. Removal of a labyrinth of the ethmoid bone, with a scraping off of the branches of the olfactory nerve in the nasal cavity, produces the same results to a higher degree ; and—

3. Removal of an olfactory bulb produces it in still greater degree. The bulb on the other side showed, in each of these experiments, a compensatory hypertrophy which Gudden estimates, not only by the always uncertain measurement of the pushing aside of the cerebral matter into the emptied cavity of the skull, but by the criterion of the thinning of the cerebral wall over the hypertrophied portion of the brain, while over the atrophied portions the corresponding thickening of the same is developed, which the relations of both experiments Nos. 1 and 2 clearly show. Hypertrophy of both *bulbi olfactorii* was obtained by the removal of both eyes, with closure of both auditory passages, corresponding with the compensatory excessive development of the sense of smell (seventh experiment).

In regard to these three experiments, the quantitative intactness of the olfactory peduncle of the injured side, and of the anterior commissure, and the assumption confirmed that the innervation of the lobe, separated from its bulb of the other side, passes through the anterior commissure.

In order to decide whether, as Gudden doubts, the cortical layer of the olfactory lobe is solely excited from the periphery, through the *bulbi olfactorii*, it was examined.

4. The removal of both olfactory bulbs, which, however, up to the publishing of this work, had not achieved the result, because the animals, failing to receive the maternal nourishment, died too soon. Gudden, nevertheless, observes that his previous assistant, Dr. Grashey,

had invented a very serviceable apparatus for preventing this mishap, and he had himself recently also succeeded in retaining alive such rabbits.

5. Removal of one of the upper lobes of the hemispheres is followed by disappearance of the band down to those bundles of fibres which connect the lower hemispheric lobes.

6. Removal of an entire cerebral hemisphere, however, leaves behind no trace of the band, and of the anterior commissure, in the subsequently-killed animal. The commissures shrivel up, nevertheless, on both sides, with the removal of one of the centres connected with them.

The second series of experiments refers to the visual organs.

8. Artificial growing together of the lids produces a somewhat more feeble development of the optic nerve, and the opposite of the optic thalami.

9. Destruction of one retina produces uncommon thinning of the optic nerve, with grayish discoloration, and beyond the chiasma (whose crossing, Gudden declares, is complete), atrophy of the tractus, of the corresponding anterior thalamus, and of the column called by Gudden the tractus peduncularis transversus, which descends from the upper thalamus on each side, as a girdle, embracing the crus cerebri. In the chiasma, however, the adjacent lower commissure, partly belonging to the inner angle, remains intact.

10. Removal of one eye in a pigeon effects inadequate enlargement of the optic nerve and the corresponding side of the corpus bigeminum.

11. Removal of both bulbi oculi in a rabbit. Optici, chiasma, and tractus (as far as the intact commissura inferior, and a fasciculus of the tractus, which should pass through the outer fibres of the pedunculus into the hemispheres), disappear, as well as the tractus pedunculares transversi.

12. Removal of both bulbi oculi in a pigeon. Here was found resulting, besides the retained optici and corpora bigemina, still a lessened weight of the hemispheres.

13. Removal of an anterior lobe of the corpus quadrigeminum, in a rabbit, leaves behind it the development of the corresponding nervus opticus and tractus peduncularis transversus, although in a much lower grade than is the case in extirpation of the globus oculi.

As for the external phenomena after blinding of one or both eyes, which vicariously increase the capacity of the senses in another direction, as well as sterile movements in the domain of the closed sense, the reader is referred to the work itself.

4.—*On the Pathological Anatomy of Paralytic Diseases of the Mind.* By Dr. H. OBERSTEINER, of Vienna (Virchow's Arch., vol. lii., Bk. 4).

After a description of the present views on the anatomico-pathological process of paralytic mental disease, and after communicating two cases in point, in which the brain was subjected to a careful microscopic examination, the author reaches the following results:

Many of those changes which observers detail as characteristic of paralytic imbecility may readily be found also in those brains of para-

lytics in which, through the long duration of the process, opportunity is given for a fundamental destruction of its elements; not, however, when the duration has been a short one, and the process is not yet completed: the first of the cases cited presents a condition in which the majority of the adduced changes are absent.

The author now proceeds to investigate the signification of the described microscopic representations, and seeks to reproduce the connection between the single phenomena. The numerous corpuscles which are embedded in the lymphatic spaces in the first case appear indeed most accurately described as lymph-corpuscles, which have passed from the blood-vessels especially in that fore-stage of dementia paralytica which is characterized symptomatically by melancholy derangement, or by exalted ideas, and anatomically by congestions of the meningeal and cerebral vessels—forms not distinguishable from lymph-corpuscles, and appearing in the lymphatic vessels hardly admit of a more suitable term. Perhaps these collections of lymph-corpuscles in the vessels have besides given rise to a generating of corpuscles in the coats of the vessels, which process can by no means be denied. At this point the author considers the granules which occur under normal circumstances in the brain as well scattered between the nerve-fibres of the cord, as also in the cortical portion, or free in the pericellular spaces. Their origin, like their signification, is unknown, but the similarity to lymph-corpuscles, as well as other grounds, extensively given in the work in question, has led the author, in the absence of a better explanation, to regard these formations as identical with lymph-corpuscles.

Soon, however, the disposition to disperse seems to reign in these organisms; they pass out of the broad lymphatic passages into narrower passages among the elements which surround the vessels. In favor of this view is the occurrence of the numerous similarly-shaped bodies in the immediate vicinity of the vessels, especially those as above described, which are ranged in parallel order to the vessels; they have evidently arrived simultaneously in the perivascular spaces, and have also, by their further movement within the cerebral substance, kept pace with them. A number of these corpuscles reached also, in their dissemination, the pericellular spaces, so that the latter, much more frequently than usual, contain such lymph-corpuscles, and also in greater numbers.

In regard to these pericellular spaces, the author (*On Some of the Lymphatic Spaces in the Brain: Session of the Royal Academy of Science, Vienna, vol. lii., January*) has demonstrated spaces around the cells of the cortical portion of the brain, which may also be injected from the perivascular lymph-spaces, and even in the normal brain often contain free bodies which are not to be distinguished from lymph-corpuscles.

Should a number of such bodies be found in connection with a ganglionic cell, a picture might easily be produced which should be taken for the process of a dividing of the granules, as has been described by Tigges (*loc. cit.*). The author is not able to convince himself of such a process in the granules of the ganglionic cells, which

come from the brain of paralytic cases, but is forced rather to point again to the strikingly-marked pyramidal forms.

Since this condition of the brain corresponds with the œdematous spots, there appears simultaneously with the outpouring of the white blood-corpuscles a considerable mass of serum, not recognizable under the microscope, poured out into the cerebral substance; which process is readily deducible from the increased blood-pressure of the previous congestion. With this stage of the exudation may correspond those periods in which the patient gives evidence of the first signs of the commencing disturbance in motility; since these latter, according to Griesinger's assertion, are at first of a convulsive nature, and weakness of the muscles, paresis, then first sets in, it appears as though through the exudation, before all irritation, paralysis of the nerve-fibres is produced; the insane ideas, with a rapid diminution of intelligence, may either continue or be repressed. It will not appear strange, therefore, if we connect the deposit of considerable masses of exudation with the hinderance which the elements of the nervous system experience in their functions, and hence seek to explain the mental and bodily depression (the latter, of course, here only regarded, inasmuch as the brain and not the spinal cord is subjected to the influence).

If we ask, now, as to the further destiny of these lymph-corpuscles which have been thrown out into the substance of the brain, portions affected with sclerosis present the desired solution.

After the lymph-corpuscles have made use of the circumstances of the change of locality, and by that means proved their capacity for life, another additional quality is made good by them: they organize themselves, through their capacity for developing into higher forms, into corpuscles of connective tissue. They send out at first small, then longer offshoots; these increase, extend farther and farther, give off side-branches, and finally we have those stellate bodies whose arms embrace the normal tissues of the brain on all sides. A starry-fibred, matted net-work now permeates the brain, excepting the physiological supporting tissue, and destroys by pressure nerve-fibres and cells; these disappear gradually as they are successively destroyed, and, as the newly-formed connective tissue presses closely upon the shrivelled nerve-elements, the volume of the cerebral convolutions is lessened; sclerosis with atrophy has resulted, which latter again is compensated by extensive effusion into the sub-arachnoideal spaces, and by the then appearing hydrocephalus internus. Thus, the third stage of the process, that of the increase of the connective tissue and atrophy, is developed, and when it has reached a high grade it destroys the patient by marasmus, in consequence of the failing nourishment, after the mental impotence has reached its highest degree.

On the above description is laid the principal ground for explaining the morbid symptoms dependent on the brain, in paralytic mental disease, especially in hyperæmia caused by a process of exudation, the cell-products of which finally pass into a metamorphosis of connective tissue, which process the author has sought to follow out in his entire work.

It is, moreover, to be remarked that the author fully recognizes another process in the brain, terminating in atrophy, which Erlenmeyer

("Atrophy of the Brain in Adults") describes, and calls primary atrophy, and which occurs as a semi-physiological process, in atrophía senilis; in this case there is therefore an insufficient nourishment of the brain, consequent upon vascular changes; according to Wedl's investigations, principally obliteration of the transition vessels.

In further confirmation of his views, the author finds—as Kjellberg has demonstrated—that syphilitic persons possess a special tendency to paralytic insanity, and, in such persons, it is well known the tendency toward the development of connective tissue in the most varied organs is very striking, and, further, in the brain of syphilitic cases the perivascular spaces are generally found enlarged and stuffed with lymph-corpuscles. In this work the author has touched only upon the changes which attack the brain of paralytic imbeciles; the pathological relations of the spinal cord in this disease (the merit of having pointed out which with special emphasis belongs to Westphal) lie beyond the sphere of this essay.

Finally, the author briefly collects the stages of paralytic imbecility, with their corresponding pathological changes, together.

Preliminary stage of hyperæmia:

1. *Stage of Exudation*.—Serous exudation and lymph-corpuscles, extravasated from the vessels into the perivascular spaces, and the cerebral substance. Commencement of parietic phenomena as far as they depend upon the brain and mental weakness.

2. *Stage of Formation of Connective Tissue*.—The lymph-corpuscles organize into connective tissue; the activity of the nervous elements becomes more and more interfered with; atrophy; complete mental decay; spread of the paralytic phenomena; marasmus.

5.—LUEBE. *On Multiple Insular Sclerosis of the Brain and Spinal Cord*. (Dtsch. Archiv viii., 1-29.) FENKER. *On Insular Cerebral Sclerosis*. (Same, viii., 126.) SCHUELE. *Further Report on Cerebral and Spinal Sclerosis*. (Same, viii., 343.)

1. Luebe reports three cases (two with post-mortem examinations) of the above disease, which has thus far been rarely described in Germany; which cases contribute some new facts toward the symptomatology of the affection. For the diagnosis in general, he asserts that this must not depend on the presence of a single special symptom, but on the variety of the phenomena, which may be a very large one, as the disease is distributed through the brain and spinal cord, at the same time alternating, and not always attacking the same parts of the brain equally. Also, according to Dr. Luebe's observation, the disorders of motion in comparison to those of sensation may predominate, so that this disproportion may be described as a principal symptom. The symptoms of spinal sclerosis are marked by a gradually-increasing weakness of the extremities, usually first the lower, combined with a violent and almost characteristic trembling on moving the limb. With further progress of the disease the paresis increases to paralysis, while transient convulsions and contractions of the paralytic muscles appear. In the latter stage, therefore, we have persistent contraction, with simultaneous complete paralysis. The disorders of motion in cerebral sele-

rosis show themselves principally in the region of the muscles of the eye, then the hypoglossus, more rarely in other cerebral nerves. Dr. Luebe points out as remarkable, in his cases, that the very important nystagmus of the French authors was absent in two of his patients. The asthmatic and apoplectiform attacks, especially emphasized by Leo, Dr. Luebe found in but one of his cases. He further remarks, what had previously not been especially noted, that in three of his cases a more or less marked glosso-pharyngo-labial paralysis occurred, with its recognized symptoms. The patients also showed, as in cases of pure bulbar paralysis, a certain helplessness and difficulty of speech. Dr. Luebe points out, as quite peculiar in all of the three cases, a monotony of speech, consisting in this, that the patient continues constantly at the same pitch of voice in speaking, and that the voice not infrequently quite suddenly turned to a higher pitch. Laryngoscopic examination shows that by intonation the distention of the vocal cords is at times relaxed; hence the author explains the change in pitch of the voice, and the monotony by the fact that the patient instinctively retains the same grade of distention.

The disturbances of sensibility were, as before noticed, rather slight, and striking in this, that in one case analgesia occurred, with an otherwise well-retained sense of touch; in another, the touch was greatly impaired, with a retention of the sense of temperature, and an even increased electro-cutaneous sensibility.

Psychical disorders were of course met with only in cerebral sclerosis; they presented no sufficiently regular features to be regarded as characteristic of the disease. As to anatomical appearances, one case is important, in which a patient, in a relatively early stage of the disease (thirteen months in all), was examined post mortem. Here, while in the spinal cord a more regular grayish color obtained, in the medulla oblongata and in the corpus striatum were found small gray, transparent, watery collections, which were composed of an extremely delicate, and largely serous, infiltrated connective tissue; their consistency was loose, the horny hardness was wanting which gives the developed process its name.

2. Fenker gives one case in which he had the opportunity of examining the earlier developing stages of the sclerotic deposits in insulated cerebral and medullary sclerosis. By the side of a hard, cartilage-like sclerosis of the right pes hippocampi major were found, in both optic thalami, rounded gelatinous, transparent knobs, of about the size of a pea. Examined fresh, with the addition of water, under the microscope, the knobs appeared to be composed of a homogeneous, structureless, colorless, foundation-substance, in which numerous cells were deposited in larger spaces. The cells had slightly-granulous contents, and mostly very distinct nuclei; while many were drawn out to a thread at one, and some also at both ends. There were, besides, many collections of granules. Through the foundation-substance ran single varicose nerve-fibres.

The spinal cord was not examined.

3. Schuele publishes a further case of this disease. This case essentially resembles, as to symptoms, the picture already drawn; almost

all the features are reproduced as given in Luebe's report : for example, the same striking disproportion between the disorders of motion and of sensation ; but the case has a special interest, not only in that the disease began at the seventh year, and caused death at the fifteenth, but especially because, besides the characteristic trembling with the movements, there was observed daily a decided rocking—an oscillation to and fro of the legs, which persisted even when they were at rest. The author remarks that thus the clinical picture is brought to resemble paralysis agitans. At the autopsy was found, besides the very extensive, partly-diffused, partly-insulated degeneration of the brain and spinal cord, an extensive sclerosis of the pons and medulla oblongata ; the entire right half of the former was shrivelled and hard. This anatomical condition also corresponds with the common assumption which connects the symptoms of paralysis agitans with a sclerosis of the pons.

6.—ESTLANDER. *On the Mal-perforant du Pied.* (Deuts. Klin., No. 17, 1871.)

The author rejects the term *mal-perforant du pied* ; in these cases it is a question of lepra anæsthetica, consequently of a neuro-paralytic inflammation of a malignant character. In this inflammation the increase of the granulating tissue is continued into the inner dividing walls of the bundles of nerve-fibres ; the outer sheath also is at times changed into a hard, blackish mass—the color of the nerves, therefore, becomes gray, with a tinge of brown, and the tissue feels hard and knotty. This foreign tissue may become reabsorbed by fatty metamorphosis ; if this takes place early, and if the nerve-fibres have not yet become atrophied, complete recovery may ensue. Through the pathological changes in the nerves the same condition is developed in the extremities as occurs in the eye after division of the trigeminus. In regard to the experiments of Donders and Snellen, the author declares himself not convinced by the conclusions of those authors, but believes rather in purely trophic nerves.

The author bases his assumption that the mal-perforant is a lepra anæsthetica, by recalling the opinion of the writers who regard it a disease *sui generis*, and who therefore are certainly credible witnesses. Nélaton says we find in this disease frequently a degree of anæsthesia. Pitha remarks, that the patient suffers with muscular paresis. The wound itself is often so sensitive as to allow of no touch, often so little sensitive that for years the patient can use the foot. The disease spares none of the tissues, resists all medication, and returns upon the slightest provocation—these are the further grounds for his view.

The therapeutical results our author also explains in the same way. Pitha calls attention to the improvement that iodide of potassium caused in one case of this disease, in which syphilis could be excluded, and in which, after fruitless treatment with the most varied medicaments for several months, the iodide of potash produced a rapid cure. The author reports a case entirely similar. The iodide of potassium acts as an absorbent on the foreign tissue in the nerves ; although the first apparent change consisted in that the peculiar epidermal thickening

around the wound began to decrease, still this may not be regarded as the direct influence of the iodide of potassium, but as an evidence of the changed relations of nutrition occurring in the part where innervation has been restored. This is the more probable, as, at the same time, the normal sensibility in the parts diseased again returns.

These thickenings of the epidermis around the sore the author regards as analogous to the changes in the cornea, which were observed by Graefe and others, after section of the trigeminus: the cornea grows dark, and produces a copious epithelium, so that, by the third day, the opaque and yellowish membrane is covered with a thick crust of epithelium and dried secretion; and Graefe assured himself, by further experiments, that this was no mere phenomenon of drying. Therefore, says our author, the term *mal-perforant du pied* should be set aside, and replaced by that of *ulcus leprasum*.

7.—*On the Diseases of the Lymphatic Vessels of the Brain.* By Dr. C. GOLGI. (Arch. Ital. p. Mal. Nerv. e. p. Alienaz Mental Maggio, 1871. From the Psychiat. Cbl., No. 5, 1871.)

The author makes known in this work the results of his investigations on the lymphatic vessels, in healthy and in diseased conditions.

In the first chapter, after a short historical exposition of the discovery of the lymphatic vessels of the brain, and the controversies which have arisen thereupon, the author decides against the view of His, and contends, with Robin, Kolliker, and Bizozzero, that the lymphatic vessels in the brain are canals (as was first asserted by Robin), which are formed by the adventitia and the walls of the blood-vessels. The calibre of these canals the author has attempted to fix by over a thousand measurements, and has shown that it varies according to the age of the individual, according to the locality in the brain, and to the diameter of the blood-vessels which pass through it. He comes, in general, to the following conclusions:

1. In children the perivascular spaces are broader than in adults.
2. These spaces have the largest diameter in the hemispheres; they grow gradually smaller seriatim backward in the corpora striata, optic thalamis, the cerebellum, and the pons.
3. The width of the perivascular lymphatic spaces stands also in reversed relation to the width of the blood-vessels.
4. The sudden enlargement of the cerebral vessels (in acute congestion of the brain) is effected at the cost of the corresponding lymphatic spaces, and, *vice versa*, the contraction of the blood-vessels (in cerebral anæmia) produces a great extension of the lymphatic spaces.
5. There may happen, however, a simultaneous distention of the cerebral vessels and of the lymphatic spaces. This is observed in individuals in whom, in consequence of chronic cardiac and pulmonary diseases, congestions and serous sweatings occur. In these cases we must assume a diminishing of the volume of the brain, by which the enlargement of the circulatory passages is compensated, as is the case in senile cerebral atrophy.
6. General or partial œdema of the brain is always connected with enlargement of the lymphatic spaces.

7. In the peculiar state of the brain which Durand-Fardell called *état criblé*, the lymphatic spaces play an important part (Bizozzero), and it is probable that the extraordinary enlargement of the lymph-spaces, which give the cerebral substance a porous appearance, is the result of an atrophy of the brain.

8. The sides of the lymphatic vessels of the brain may present various pathological differences, of which the most important are:

a. Fatty degeneration. This is found in children who have died during the first years of life; it generally extends at considerable distances on the vessels of the different regions of the brain. It is, indeed, seen frequently also in adults, but never to such extent as in children.

b. Chalky degeneration. This is more frequent in adults, and presents hard, brittle, flat, or rounded deposits.

c. Pigmentary degeneration occurs, at times, in the form of long, tortuous stripes, which are formed by the deposit of pigment in the extended cells of the lymph-tubes.

9. The contents, also, of the perivascular lymph-spaces of the brain may be pathologically changed, and, in fact, by relative variations in the quantity or the quality of the normal component parts (deposit of lymph-corpuscles, fatty degeneration of the same, etc.), or by the presence of pathological products, such as pus, tubercle, elementary deposits.

10. The perivascular lymphatic vessels may be the means by which new formations of the brain are transplanted from one point to another.

8.—*Suicide*. (From the Jour. de Méd. Mentale, vol. x., No. 9-12, p. 373.)

Every accredited theory has its inevitable consequences. Scorn of death engenders suicide. The act is multiplied as soon as, instead of despising it as an act of cowardice, it becomes honored as a manifestation of courage. Religious prejudices produce frequent examples of it among certain peoples. Should materialism become a popular belief, we would find the contagion of voluntary death become common. Many sects regard it as right to throw off an existence which has become insupportable, or which, being near its allotted term, nothing but infirmity may be expected. Besides, it may be a question of subsistence. The impotent aged, by destroying himself, suppresses a useless mouth. It is found grand, at times, not to survive the reverses of dishonor. Our readers will thank us for reproducing an extract of a curious note which we met with, turning over the pages of the "*Annales Médico-Psychologiques*" (1864, vol. i., p. 462):

"Sesostris, conquering and glorious, killed himself after a reign of thirty-three years. He was not insane; did he wish to add a leaf to his crown? He was struck with blindness; blindness sours the temper. The Kamtchatdales had several ways of killing themselves. They counted formerly fifteen thousand; to-day there are but three thousand. Is this enormous decrease to be attributed to suicide? The Troglodytes, an ancient African race, on the borders of the Ara

bian Gulf, strangled themselves as soon as they were no longer able to pasture their flocks. After the taking of Abydos, the inhabitants killed themselves in a mass, according to the avowal of Philip, their conqueror, who authorized the immolation for three days. (Seme-laigue cites this fact in his fine work on the diagnosis of the varieties of suicide.) At the siege of Numantia, the defenders of that city, in order not to fall into the hands of Scipio, killed each other, after burning their wealth. In Greece they burnt themselves, with grand preparations. At Athens the question was submitted to the Arcopagite. In the second century, the eccentric philosopher, Peregrinus, burnt himself with ostentation at the Olympian games. The announcement of his proposed death drew a large number of spectators.

"The custom of suicide took on divers phases in Rome. Under the republic, courage was the motive sentiment; under the emperors, they thus escaped the proscription. It insured sepulture and respect of the testamentary acts. Toward the end of the reign of Tiberius, the evil took on such an epidemic character that, to arrest it, the right of burial was denied. But they eluded the law by causing themselves to be killed by a slave. Every thing degenerates. After the defeat of Allia and the taking of Rome by the Gauls, the most illustrious senators immolated themselves. Later on, if an emperor was at the point of death, the Romans were known to promise, if he recovered, to kill themselves, or to fight in the arena. Caligula compelled two of his flatterers to fulfil their promise.

"At the death of the incas, their wives and servants offered themselves for sacrifice in such large numbers that some had to be turned away. At times, the high officers of the court in Japan engage not to survive the emperor. Two officers are cited who ripped up their bowels on the stairs of the palace. At Malabar, miserable wretches are obliged to strike twelve times, with twelve different knives, upon twelve parts of the body, while pronouncing these words twelve times: 'I kill myself in honor of the idol!' The priests of that country oblige the widows to burn themselves. On many islands of the same coast, the devotees allow themselves to be crushed under the wheels of an idol, which is drawn about in a car. The Hindoo women (those of Bengal) kill or burn themselves on the funeral-pile of their husbands. In 1614 three wives of a king burnt themselves with his body. On the coasts of Coromandel they are buried alive. In America the savages chanted in the midst of their agonies. The old men killed themselves, or begged to be killed. Slaves and officers joyfully followed their master or prince to the tomb. The discipline of Christianity is adverse to suicide. The chapter of a church of Charlemagne forbids the saying of mass over suicides, and the Church refuses them ecclesiastical burial."

9.—*Case of Insanity in a Child of less than Five Years.* By Dr. CHATELAIN. (Jour. de Méd. Mentale, vol. x., No. 9-12, p. 322.)

Disorder of the mental faculties presupposes their exercise. The latter being much restricted during the earlier years, insanity, properly speaking, should itself be very much limited in its manifestations. At

the very most it would consist in vague and incoherent agitation, if not imperfection or idiocy; a double state frequently occasioned by affections called cerebral or convulsive neuroses. The child, living in the present, is besides, much less than the adult, exposed to the action of those causes of perturbation which are born of deception and sorrow. In it, in fact, psychical anomalies, although common, rarely affect, to the degree of most authors, the incontestable type of mental derangement.

It is toward the age of ten or twelve years that these examples should commence to be thrown into relief. Cases are cited, however, much more precocious. Such is especially that of Dr. Chatelain, published in the "*Annales*." The little patient was but five years old, and, in connection with it, our distinguished colleague Prefargier presents some preliminary historical considerations. Thurnam, among 21,333 insane, counted but eight children. Unfortunately, the limits of the age are not given. For some, the period of childhood ends at fifteen years; with others, it descends to twelve or even ten years.

In 1802 Joseph Franck is said to have found at St. Luke's (London) a young subject, maniacal from the age of two years. Esquirol cites as presenting the same affection, two boys, one of eight years, the other of nine years, a girl of fourteen, and a case of melancholy at eleven years. Without referring to special cases, Dr. Morel admits, between six and fifteen years, a certain frequency especially of suicidal cases. The statistics of Brierre de Boismont comprise 4,595 suicides; 104 were effected by children under fifteen years, none before ten years. Griesinger refers to mania those attacks of screaming and rage which we see, occurring periodically, in little children of three and four years. Thore has observed hallucinatory frights.

To these facts, Chatelain might have added some others collected by one of the old pupils of Bicêtre, Le Paulmier ("On Mental Affections in Children, especially Mania," Thesis of 1858). Guislain has observed homicidal tendencies in children of a very tender age, also suicidal tendencies and hallucinations. In his practice, Bierre de Boismont is reported to have treated a child of six years with mania, and a little girl of seven with ecstasy, seeing visions of angels in heaven. In a report, comprising the insane admitted at St. Yon, from 1827 to 1834, De Cotteville calculates the proportion in series as follows: from five to nine years, 0.9; from ten to fourteen years, 3.5; from fifteen to twenty years, 20. Aubanel and Thore, in their statistical researches, have also shown for the year 1839, at Bicêtre, eight cases of mania and one case of melancholy between eleven and eighteen years. Ferrus, it is said, had examples at an age still less advanced.

Le Paulmier worked upon the same elements as those of Aubanel and Thore. The children's division, at Bicêtre, comprises cases of six to eighteen years. Many belong in reality to the period of adolescence. A certain number were from eleven to fifteen years—abstraction being made of the epileptics, with whom, as a consequence of the attacks and the yearly tendencies, temporary symptoms of aberration show themselves under a maniacal or hallucinatory form, but which, because of their origin, are ignored. In the cases noted by

Le Paulmier the forms are divided into instinctive perversions, lypemania, and mania. These, however, were for the most part veiled by a sort of dulness, and complicated by ecstatic suspensions, which is explained by the nature of the physical or the moral causes. Many little girls, treated by Mitivić, at the Salpêtrière, owed their disorder to serious fevers. From the effects of an evacuation of a number of entozoa, Revolat observed the disappearance of an ecstatic mania, which had affected a child of twelve years for a year. In the journal *Experience* (December, 1840) is published the substance of a medico-legal paper, which was used by Le Paulmier, concerning three quite young children simultaneously attacked with trembling, moral indecision, and mania, caused by an intoxication by mercurial vapor. Other observations of ours occur in the journal mentioned. In the first place, a boy of fourteen years, a novice in a religious institution, and the object of especial surveillance because of his solitary habits. He was surprised one night, and strongly impressed by the idea of divine punishment. From this cause, hesitancy, incoherency, and ecstasy. A second case treats of a young girl of sixteen years having become maniacal in consequence of an attempted rape. A young lady of the same age, crossed by obstacles to a marriage to which her relatives had consented, drowned herself in a river where many years before an ancestress had precipitated herself. These suicides from vexation are frequent in childhood. Semelaigne (*Journal de Méd. Mentale*, vol. v., p. 325) and Callineau (same, vol. viii., p. 417) have brought together some curious examples.

The interesting point in Dr. Chatelain's case is the exceptional age of the child, namely, four years nine months. Louise D. was brought to him May 31, 1869, by the father and mother, easy farmers, in the Jura Mountains. Frightened by the trial of a fire-engine, she was attacked about two weeks previously with an ill-developed scarlet fever. Since then, odd, uncertain, seeming to hear things which do not exist, she answers without sense to questions addressed to her. "Bring your dolly," said her father to her. She ran, came back empty-handed, crying nevertheless, "Here it is." A vermifuge was administered, which caused the evacuation of three lumbrici. The mental trouble persisted and increased; there was neither hereditary taint nor masturbation.

Externally, nothing abnormal; an intelligent physiognomy, the pupils contracted. But her character had changed. A sort of boldness replaced her natural timidity. The events of the journey, the sight of the lake of Neuchâtel, the medical examination, neither astonished nor moved her. Her words are rapid and vibrating and at random. She suffers as it were successive attacks, one day one, another day another. At the time of the first examination, the name of one of her companions was mingled incoherently with her answers. "Are you tired?" "Laura knows very well." "Did you see the big lake?" "Laura cried a good deal." To other questions the same incoherent responses: "Laura did not see the firemen. She told me it was so. Laura eats not often. . . ."

All this is said with remarkable composure. At times the patient turns her ear to listen to imaginary noises. If a piece of fruit,

that she is fond of, is placed in her hand, strawberries among others, she turns them over and over, does not put them to her mouth unless ordered to do so, makes as though she would throw them away, and swallows them only after much delay.

Chatelain ordered a weak solution of bromide of potassium. The child was to be brought back to see him. At the end of two months not having heard any news of her, he decided, urged on by the desire to learn what had passed, to visit her at her village. The prescription had not been procured because the day after lucidity of mind returned. Only, in place of the previous automatism, a singular loquacity had succeeded. Louise D., talking of death, of heaven, of God, made the most extraordinary reflections upon these solemn subjects. These symptoms lasted a month; then the normal condition returned.

Nevertheless, this crisis was not the last. Eight days after the visit of Chatelain, Louise, on going into a relative's house, and over-excited by the latter's remarks, had a relapse. Constantly in motion, she gesticulated, grew angry, struck, wept, and wished to kill her relatives. Ten days after, a new calm, leaving the child, at the time of publication of the article, in the following situation: Slight emaciation and paleness, pulse slightly intermittent; nasal herpes; some dreaming during sleep; sensible answers, reserved behavior; had forgotten her journey; no sustained application; capricious, weeping, and easily irritated. Chatelain learned subsequently from the village pastor that the amelioration persisted.

With every reason, our distinguished colleague believes that the affection of Louise D. has no relation to that of imperfectly developed or backward children. What was the cause? An emotion, or the striking in of the morbillous eruption. Perhaps both circumstances. As to the psycho-morbid form, Chatelain hesitates to assign it a nosological status. It has all the traits of primary dementia at its beginning. In an adult the question of simulation might have arisen. The words and actions are essentially like those who feign a number of defects. This combination of features is what we have noticed, and what Dr. Paulmier has assayed in his essay to show forth. Many causes act especially upon children: on their moral nature, depressing causes, annoyances, frights, ill-usage; on the *physique*, certain nervous affections, typhoid and the eruptive fevers, worms, and precocious, vicious habits. The causes having the greatest analogy oscillate more or less, commingled between excitation, erethism, and cerebral depression. When the first predominates the delirium takes on the aspect of mania by the disconnection of thought, the turbulence, and the cries. Attacks of ecstasy or of cataleptic immobility frequently complicate the second. As to the third, more common, and connected either with nervous inertia, a sanguinous congestion, or on a slight serous effusion, it forms a sort of type. The bearing is nonchalant, the face haggard and astonished. At times a marked dilatation of the pupils is manifest. The ideas are vacillating, confused, the memory abolished or uncertain, and the sleep disturbed. Capricious melancholy or perverse tendencies may be noticed; in the midst, however, of this disturbed state, hallucinations commonly stand out in

relief, which, according to their nature, provoke manifestations of fear, or mysterious ideas. Each one of the forms is represented in the series of thirteen examples at the end of Le Paulmier's work.

C., aged sixteen, remains for several hours as though absorbed in some vague contemplation. Physiognomy dull, over which occasionally passes a foolish or an ironical smile. At other times of the day, C. shouts, sings, whistles, laughs, and cries. He breaks windows, strikes his companions.

B., aged sixteen, an apprentice in a workshop, has been represented by a somnambulist to be the author of a theft committed on his master. He shows uncertainty and restlessness; he is spoken to in vain; he assumes impertinent attitudes, shows a scornful loquacity, and passing ecstasies.

P., aged seventeen. Animated face, eyes haggard, rambling talk, extreme turbulence. Throws himself into ecstatic poses, during which he seems to converse with imaginary persons. He repeats that God is his father.

Poug., at twelve years, had a typhoid fever. Since then a strange alternation between sombre moroseness and an unusual gayety and agitation. He says he is descended from Joan of Arc, a son of Louis XIV. Has visions.

T. presents maniacal agitation, interspersed with periods of apathy; mouth wide open, expression stupid, slow in answering, heaves sighs, at times insulting.

C., typhoid fever, tedious convalescence, babbles unintelligible words, expression fixed, at times seeking to injure and to bite. Fixed ecstatic position, weeping and sadness.

N., fourteen years old. He is supposed to have been unjustly treated by his step-mother. False sensations, stupor, and passing ecstasies.

Desp., sixteen years old, comes from La Roquette. Astonished expression, odd gestures, ecstasies, believes he sees his dead parents, etc.

D., aged fifteen, inmate of the same institution. Voluble talk, incoherent.

Ch., fourteen years. Mania, following typhoid fever; cries, lamentations, rare attacks of ecstasy.

F., fifteen years. Commenced with a melancholic depression, to which succeeded mania and ecstasy. Quiet rambling, with instants of sense. Drawling talk, ironical expression. Strange postures during his prolonged crises of ecstatic immobility, apathy, hallucinations, masturbation.

We might enlarge the catalogue immeasurably. Let us content ourselves with a final example which was furnished by a little girl of eight years, from the department of Aisne. The state in which she had remained for two months had occurred two years before, and had lasted several weeks. No appreciable cause. The child is large, graceful, and pretty. At first sight one would say intelligent. The face does not lack animation. She comes forward naturally when called, but soon the most complete incoherence is manifest. It is impossible either to fix her attention, or to temper the restlessness of the poor

child. It is by accident only that she makes a proper answer. She is silent, or offers at long intervals nothing but incoherent words. She goes here and there, and makes a hundred turns about the room without an object. Ten times a day, even during meals, she is seized with a frenzy, she thrashes about, roars, rolls on the ground, bites, or runs violently. Pupils greatly dilated. Sleep bad, interrupted by frightful nightmares. Suspecting the cause might be worms, anthelmintics had been prescribed, but in vain. Baths, the use of arnica, and Fowler's solution, a few injections of sulph. quinine, which last, however, were given with difficulty, gradually amended the symptoms.

We must not, however, attach too absolute a confidence in such improvements, which are often only remissions or intermissions. There have been certainly permanent cures, but, as in this case, where we had a return after a long interval, the symptoms in many cases obstinately return at periods more or less fixed. In 1867 we treated a girl of fifteen years, who, having already suffered from a first attack eighteen months before, has to-day reached her sixth. The paroxysms last usually from five to six months.

10.—*On Progressive Bulbous Paralysis.* By Prof. E. LEYDEN. (Arch. für Psychiat., ii., 3.)

Prof. Leyden narrates the history of three carefully-observed cases and their post-mortem appearances and microscopic examination, and three others, observed during life, and comes to the following conclusions:

The process lying at the bottom of the progressive pharyngo-labial paralysis may be assumed without doubt as myelitis; and the symptoms during life also speak in favor of a chronic inflammatory process. At the same time it is by no means to be overlooked that the anatomic significance of the process in the nervous system is still very uncertain, and that we especially have not yet by any means clearly fixed the conception of myelitis, nor accurately discriminated between it and atrophic and degenerative processes. We find, however, in the progressive bulbous paralysis not only the development of granulated fat-cells, but also an increase of the stellate bodies in the spinal cord. A decided increase of interstitial cells and nuclei, aside from suppurative inflammation, is by no means observed in every case of myelitis. On this ground, Dr. Leyden believes the designation myelitis may pass muster for the nonce. Meanwhile, it must be noted that the form of the disease is characterized by striking peculiarities. The first striking phenomenon is the spreading. The process corresponding with the symptoms during life is confined to the anterior motor portions of the cord; the posterior columns are intact.

The posterior lateral and inner anterior columns are mostly attacked, although the parts lying between them are not quite intact.

The second peculiarity is the fatty atrophy of the nervous roots, especially evident in the cranial nerves, and this atrophy of the nerves which is continued into the brain, but decreases toward the periphery, is connected with atrophy of the muscles in the form of progressive muscular atrophy, a relation which is by no means usual in other forms

of myelitis, for in most cases first paralysis and then gradual emaciation of the muscles occur.

We have, then, to do with an atrophy that is a degeneration, which, as it appears, attacks the whole extent of the motor fibres, from the periphery of the muscular fibres to the centre of the motor ganglionic cells. That the process proceeds from the central organ can hardly be doubted. But whether it there originates in the white or in the gray substance remains undecided.

The symptomatology, which is well known through the descriptions of Duchenne as well as by the writings of Duménil, Trousseau, Wachsmuth, Huber, Benedict, Rosenthal, Ziemsen, Stein, and recently by Eulenberg, and others, is discussed and examined by Leyden on the basis of his own individual observations. The relation of the bulbous paralysis to muscular atrophy is estimated by the author in this manner, that he regards the cases, in which this combination is observed, as a modification of the glosso-pharyngo-labial paralysis, and between these and the ordinary progressive muscular atrophy, on the nature of which opinions still vary, he assumes a close relationship, in that in the two affections disease of the cervical portion of the spinal cord is frequently met with. It is, therefore, highly probable that there is a connection between some of the forms of progressive muscular atrophy and bulbous paralysis, and it is demonstrated that in one class of cases of progressive muscular atrophy there exists a fatty degeneration of the anterior spinal roots, in other cases myelitis of the cervical portion.

The term bulbous paralysis, which was proposed by Wachsmuth, is accepted by Leyden, although he does not find it exactly suitable; and yet the disease must be called progressive, for the process and the symptoms are by no means confined to the medulla oblongata.

The treatment of this disease consists, according to Dr. Leyden's experience, principally in the employment of the uninterrupted current upon the medulla oblongata and the sympathetic, as has already been advised, especially by Benedict. The local galvanization and faradization of the atrophied muscles (lips, tongue, and arm) are not to be neglected.

11.—*Case of Glosso-pharyngo-labial Paralysis without Bulbous Sclerosis.* By A. VOISIN. (Annal. Med. Psychol., 1, 71.)

The patient, aged seventy-seven, was admitted March 16th, 1868, in Dr. Voisin's ward. Three weeks after her admission, occurred loss of speech, which, however, gradually returned, so that a month after the patient was able to speak, with the exception of her own name, which she appeared to have forgotten. After remaining three months in the hospital, suddenly and without loss of consciousness, after a vehement mental irritation, total loss of speech again occurred, as also the loss of power to whistle, and to raise the tongue. The mastication and deglutition of solid substances were impossible; the saliva flowed from the mouth; the uvula was immovable; the inspiration, sobbing, and respiration, generally difficult. Taste and sight extinguished. The glottis was unfortunately not examined. The mind, as well as motion of the extremities, preserved. The patient had to be nourished through an œsophageal tube. She died suddenly after the last attack.

The post-mortem examination showed a small, yellow focus of softening at the external part of the left lenticular ganglion, which, to a very slight degree, extended into the left island, whence the author attributes the amnesia.

At the upper and lower surfaces of the two lesser cerebral hemispheres, just beneath the connecting arm of each, were discovered two tumors, which appeared to be epitheliomata of the arachnoid. The left tumor, of the size of a walnut, reached to the medulla oblongata in such a manner that the auditory, facial, hypoglossus accessorius, and the glosso-pharyngeal nerves, were compressed. These nerves were by one-half slenderer than those of the right side. The facial was softened.

The tumor on the right side was of smaller circumference, and did not extend to the medulla oblongata.

The nerves appeared normal, with the exception of the atrophied hypoglossus. Neither medulla oblongata nor the pons was sclerotic.

No microscopic examination seems to have been made, and, therefore, as to the extent of the atrophy of the nerves and nerve-roots, the nature of the corresponding nerve-cells, and finally of the single fibres of the medulla oblongata, nothing can be gathered. The interesting work of Leyden shows that, besides the condition of the cerebral nerves in question, there was found greater or lesser extension of the fat-granules conglomerate in the motor portions of the medulla oblongata and in the spinal cord, and that there also the same sections were most affected which were attacked by the secondary degeneration of Turck, namely, the posterior sides and the inner anterior columns.

II.

MEDICAL JURISPRUDENCE.

On the Doubtful Cases of Insanity in a Clinical and a Medico-Legal Point of View. Dr. BINOREL. (Jour. de Méd. Mentale, tome x., Nos. 9-12, p. 313.)

IN mental alienation, what most stands in the way of accurately solving equivocal cases is, the absence of any uniformly-received theory. Since the law of 1838, so pregnant with results, and yet so scoffed at, the study of insanity has made notable progress. The numerous workers, created by the multiplication of asylums, have deeply turned the soil. We can no longer depend upon the classifications of Pinel and Esquirol. Shades, scarcely indicated by those illustrious masters, are thrown into relief, suggest new views, and lead to clear distinctions. Drawn to the slightest details, each one has experience of the facts, and an intuition of their consequences. Unfortunately, they are scattered materials which in part still await the construction of the edifice. . . . We are reduced to the confusion, if not to the antagonism, of individual conceptions.

After the general paralysis, so well described by Bayle, Delaye, and Calmeil, Georget brought into relief stupidity, on which, subsequently,

Etoc-Démazy wrote a remarkable thesis. Ferrus, in his ingenious lessons, recurring to the question, made its aspects more exact. In opposition to monomania, too much confined by Esquirol, he enunciated some excellent ideas on partial delirium, which, without ceasing to be, may extend to a diversity of subjects. According to Falret, delirium, a question of quantity, should form groups: *aphrenia*, *panto-mania*, *polymania*, *etigomania*. Monomania he regards in some sort a being of reason. He also admits a *circular form*, in which the physiognomy of the disease offers, in alternating periods, mutations which are more or less contrasted and regular.

Guislain, highly perplexed with the chaos of the varieties and terms, hardly knew where to settle, dividing and subdividing without plan. According to him, the forms of insanity are elementary or compound. Of the first he distinguishes six groups, melancholy, ecstasy, mania, folly, delirium, dementia. The second comprehends four: polyphrenopathy, polymelancholy, polymania, polydelirium. Each case should have, besides its dominant radical phenomena, on which the designation is based: melancholic mania, maniacal melancholia, delirious mania, maniacal delirium, mania with dementia, dementia with mania, epileptic mania.

Epilepsy with Mania.—Finally, as regards progress, they may be: continuous, remittent, intermittent, or periodical. As to morbid changes: primary, secondary, tertiary, etc., transitory or permanent. As to seat: idiopathic, sympathetic. As to pathogenetic importance: essential or symptomatic.

In a first essay on imbecility, Baillarger, believing in an activity of the imagination, connected that form to lypemania, under the title of melancholy with stupor. Later on, enlarging the picture, so as to include the majority of cases of insanity with melancholy, and regarding the depression as dominant, he made but one genus of them, which he carried from partial delirium to general delirium. Hence, independently of dementia, the three species: monomania (partial insanity), melancholy, mania (general insanity); a division completed by the insanity with double form, the *folie circulaire* of Falret. In the opinion of Morel, the received classifications, based on the symptoms, would conceal the morbid state, the phenomenal expression not necessarily responding to an identical psycho-cerebral condition.

It should be the object of science to try to harmonize these two elements, the cause and effect, that is, to arrange a nomenclature whose principles and basis should depend on the etiology. Adopting this view, the author, in his "*Traité des Maladies Mentales*," forms six groups as follows: 1. Hereditary alienation, subdivided into four classes, in which are included individuals of nervous temperament, the eccentric, and incoördinate, the instinctive maniacs, the simple-minded, imbeciles, and idiots; 2. Alienation from intoxication; 3. Epileptic, hysterical, hypochondriac insanity; 4. Idiopathic insanity; 5. Sympathetic insanity; 6. Dementia. On examining each of these preceding categories, one circumstance is striking, and that is, the omission of all reference regarding the mental faculties, their relations and subordination.

The clinical fact is alone regarded; and furthermore, each one, interpreting in his own way his impressions, arranges his own peculiar

edifice, without troubling himself to confront it with similar constructions, which he contents himself by condemning *in toto*. Thus, the ground is encumbered with individual opinions, producing a chaos, defying all disentangling. How is it possible, in fact, to utilize the pathological data, if from prejudice we ignore the conditions of the normal state? To cite Morel only, what is the limit of hereditary influence? Can we always distinguish idiopathic from sympathetic insanity? In medicine, when the cause is discovered, and we have reached that point with almost all the neuroses, do we not commence by giving a name to the group of symptoms, proceeding subsequently as far as possible in the discovery of the peculiar variety? The light does not proceed from that quarter. This thought, which strikes us at once, led Griesinger to examine the matter on new grounds. He saw that the agreement so generally desired could proceed only from the authority of Science, and that Science herself could only effect it by combining by severe analysis all the psychological, physiological, and clinical elements, in the formation of a firmly-assured doctrine. This great task the distinguished alienist had the courage to undertake with that energy and perseverance for which he was noted. Putting under contribution, simultaneously, philosophy, the recent discoveries in the nervous system, and clinical observation, he ended by creating for himself a criterion which he employed to include, by a scientific systematization, all the forms of mental derangement. Unfortunately, philosophy is full of stumbling-blocks. However ingeniously inductions may be drawn from results in regard to the structure and functions of the nervous system, by microscopic inspection, and by electrical currents, they have not filled up the bottomless abyss which separates the incontestable facts from the psychical phenomena, which are constantly escaping into their mysterious sphere. Griesinger, despite his efforts, has produced only an artificial diffuse work, less clear than the classic nomenclature. After some subtle speculations on the *complexus* changing from the *me*, the author, after the example of Baillarger, takes, as a double pivot, depression and excitation, excluding from the first the distinction of general and partial delirium. Depression, exaltation, enfeebling, these are the three heads under which all varieties of insanity should be classed. To the first category should belong melancholia (subdivided into hypochondria, melancholy proper, that with stupor, with tendencies to self-destruction, and with super-excitation of the will); to the second, mania and exalted monomania; to the third, systematic madness, agitated dementia, and apathetic dementia, idiocy and cretinism. No psychological or doctrinal traits in this arbitrary classification. It was superfluous to expend so many psychocerebral demonstrations to arrive at this rough plastic formula: depression, enfeeblement and excitation—to efface, with the stroke of the pen, the distinctions referring to general insanity and partial insanity, and to elevate to the rank of species mere epiphenomena, like those of self-destruction and super-excitation in melancholia, or of exaltation in monomania. Much more exact and more comprehensive has seemed to us the classification given twenty years ago by Delasiauve. One easily follows the author's explanations of the phases of logical elaboration, suggested by it. Taking fact upon fact, forming upon each a

pathological ideal, he compares them, seizes their analogies or dissimilarities, combines them according to their affinities, at the same time striving to fix pathologically and psychologically the causes of the combinations, differences, and contrasts. About sixty types are thus reviewed; and as he advances, step by step, his horizon brightens, and he sees a picture where his different views fall naturally into their respective places. Nothing taken for granted.

Between the general and partial disturbances is there only a question of degree? In scrutinizing their origin Delasiauve concludes not only a diversity of character—he is led at the same time to recognize an important duality in the mental process: on the one side, the power of reasoning, or syllogistic faculty; on the other, material or mobile, the sentiments under the empire of which this power is exercised, and the ideas which, produced by intellectual operations, become confounded, when once acquired, with the sentiments, and serve at the same time as incitement and as aliment to the labor of thought. Do these views correspond to distinct realities? Undoubtedly, since they have resulted from the analysis of parallel morbid types. From this resemblance depends another: we may presume that in insanity the lesion affects especially either the syllogistic order, or that of the sentiments or thoughts. Now, under this hypothesis, what should result? Every alteration, injuring intrinsically the chain and expression of the thoughts, implicates a delirium more or less general. Inherent in the instrument, the disorder will appear, no matter what subject it attacks. It would not be the same if the seat of aberration resided elsewhere. A prey to unusual sensations, to imaginary fears, to blind impulses, the patient, unless the perception of danger awakens his resistance, will reflect the ascendancy of these abnormal influences in his language and his acts. His logic, although defective, will still be logic. Then, as the attack is rarely continuous, and as the respective independence is manifestly proper either to the sentiments or to the ideas, we understand that, outside of the delirious act, and on points foreign to its sphere, the appreciation is exact and the reasoning correct. This is precisely what we find. As the result of the interpretation of abnormal facts, the psychological theory justifies by induction the source from which it emanates. The varieties of mental alienation, indeed, form two marked groups, where the slightest shades intermingle in conformity with the nosological law. On the one hand, a direct expression of syllogistic disorder, the delirium necessarily generally includes, according to the nature of the functional lesion, maniacal excitation and mania (perversion with simple mobility or marked incoherence), dementia (degradation of the faculties), the same state with concomitant change of motion (general paralysis), mental stupidity or obscurity, from the slightest dulness up to the most absolute suspension of the psychical faculties.

In the second group stand the cases of partial delirium. But these are not limited to the melancholia of Pinel, or to the monomania and the hypomania of Esquirol. The latter, indeed, was separated from it principally by Delasiauve, who, at the suggestion of Billarget, classing it, because of the dominant obtusion, with general insanity, made of it one of the numberless species of imbecility.

It has been erroneously supposed that all cases of melancholia were dominated by fixed ideas, by imaginary fears more or less firmly radicated. Thanks to his psychological distinction, Delasiauve foresaw that, under the empire of fortuitous and frequently erratic nervous modifications, the mind might experience fascinations and tendencies very different from the fixed circumscriptions of monomania. These cases, which are numerous, defied diagnostication, and obscured the nomenclature. Disseminated among the manias, the monomanias, the melancholias, and the hypochondrias, it is they especially which furnish the strongest contingent to those cases of instructive, hysterical, hypochondriac insanity, and reasoning, lucid, hereditary insanity, which have been the objects of so much controversy, before the courts. Delasiauve, who gave them the significant name of pseudo-monomanias, ranged them scientifically as a genus, "*partial diffuse delirium*." Partial, because the power of reasoning is not affected in its essence, as in cases of general delirium; diffuse, because, subjected to all the vicissitudes of the spasmodic or congestional movement, which occasions it, it follows its ups and downs, disappears and returns, rarely uniform, but almost always undecided, complex, and mobile, in physiognomy. As regards monomania (fixed systematized delirium), the differential features are abundant. As to this latter, as various as the individual predominances, it demands hardly more than an ordinal classification, according to the particular character of the diseased convictions or disordered sentiments; the leanings toward moral tendencies, effective or personal. The most important limitation is that which consists in distinguishing the cases of purely conceptive or sentimental origin from those where the delirium, of a perceptive character, is produced by false sensations: illusions and hallucinations. The delirium called perspective is generally only a delirium of hallucination.

We cannot enter into any very detailed consideration of the subject. What appears to merit attention is the simplicity of the bases upon which the division of Delasiauve rests, the nicety of its demarcations, and the facility with which all the facts therein classified find their natural place. Far from running against the ancient classifications, it disentangles them, giving signification to a crowd of unexplained aberrations. We do not find, either in the definitions or in the demonstrations, such vague words as intelligence, judgment, imagination, etc. The functions in their diversity are alone included, as confirmable and tangible facts. The criterion, the exclusive result of the method of observation, permits us also, especially for medico-legal solutions, to follow intelligently the evolution of the facts, to mount to their source, to appreciate their psycho-cerebral conditions, their particularities and affinities; to account for acts, and to explain their mechanism. Thus, we feel that we cannot do better than to conform in our *exposé* to the laws of that coördination, which is capable of dissipating, *ipso facto*, many a doubt.

Final Considerations.—After having shown the diverse forms of insanity, and justified each by a respectable number of cases, Bihorel presents the following remarks on the whole work, which form, as it were, a conclusion:

In mental medicine the nomenclature is one of the dominant

questions. The exact determination of the genera and species alone permits us to distinguish, through clouds and capricious evolutions, the character and bent of the cases in dispute. This matter has been too much neglected. We have seen also what obstacles the attempts at classification have had to encounter. In the first place, each one, without attempting to verify the conceptions of predecessors, has produced his own. The majority have considered only the most salient symptomatic aspects. A few have thought to find in the etiology a more solid basis, as though the very idea of a neurosis did not exclude any such exactitude. In England, in Germany, and in France, they have attempted to utilize the philosophic data, combined, in a few cases, with the recent ideas of the nervous system. But psychical science is full of confusion and of speculative views, and however curious the results due to histology, it has contributed thus far nothing exact toward the relation of the nervous conditions to the intellectual and moral manifestations. We foresee, however, how faulty must be the interpretation and the coördination of the morbid phenomena, if the moral functions remain unappreciated. In order to dissipate these clouds, it was necessary, by scrupulous observation, to penetrate into the substance of the facts, to create from them a pathogenic ideal, which should cast rays of light upon the smallest peculiarities; and, by analysis, to compare the regular play of the faculties with the psycho-cerebral deviations, and to bring out from such comparisons, at the same time, a psychological theory simple and positive, and a division of the forms of insanity methodically founded on positive analogies and differences. Such has been the work of Dr. Delasiauve which we have tried to follow in the above report. Let us say briefly what progress it seems to us to have brought to the pathology, to the hygiene, to the therapeutics, and to legal medicine of the insane. What are the limits between reason and insanity? This point, always dark, which has caused so much reproach to alienists, Delasiauve has cleared up, thanks to the formal remark, "Do not confound unreasonableness with insanity." A second result is the easy classification of the facts in their respective places made evident by their concordance with the data of the moral state. Under the title of mania all agitations of mind were engulfed. In separating from the womb of obscurity those which proceed from a conceptive or hallucinatory outburst, from turbulent incoherences produced by nervous or congestive irritation, the same author has succeeded in restoring to their natural group that of stupidity, the great majority of saturnine, alcoholic, puerperal, epileptic, hysterical, etc., etc., insanities. He has also attached to the subdivisions of the same general order, not only the numerous category of lypemantias, which had wrongly swollen the contingent of partial delirium, as well as certain melancholic forms, more or less vague, where obtuseness is the culminating point. This transposition has thrown light on their history, previously so little understood. Without referring to an empiricism at times deceptive, their origin is better comprehended, as well as the physiognomy of their symptoms, and the vicissitudes of their evolution, and, with the curative possibilities, the nature and value of their therapeutics. The demonstration of pseudomonomania

especially has caused a decided revolution, by reducing the domain of monomania by two-thirds, counting in that of instinctive monomania; by specifying clearly the cases of reasoning insanity, those undecipherable enigmas, and by unveiling one of the most profound sources of the criminal acts known to the tribunals. Finally, independently of considerations relative to fixed eccentricities and to imponderable agents, the distinction of partial, extra-physiological delirium is not without importance, were it only to throw into bolder relief the pathological features of the most common monomania. These new demarcations have their practical consequences. The prognosis of mania passed for one of the least unfavorable. It acquires a certain gravity, if we separate from it, the inebriate, epileptic, puerperal manias, forms generally transitory. It appears, on the other hand, that systematic delirium is almost always incurable, while the pseudo-monomanias have often an accidental course, and recover in considerable numbers. We may measure also, whether the case belongs to a monomaniacal circumscription, to an acute or a chronic obtusion of the senses, what the chances are of recovery from any persecuting or perceptive delirium. The measure of isolation is readily generalized upon. Esquirol admits an exception for certain patients who enjoy the protection of the family-roof. But the illustrious master does not specify the kind of insanity by which such insane are attacked. Besides, Delasiauve has shown that that rule would apply to almost the whole category of melancholy, pseudo-monomaniacs who, having a consciousness of their trouble, forestall care, are grateful for the solicitude of which they are the objects, and are not accessible to consolation. Esquirol's remark was made *à propos* of a similar case. What unfortunately necessitates arrangements which would not seem inevitable, and which the patients often call for themselves, is the frequency, the gravity, the unexpectedness, and the irresistibility of the injurious promptings over which the strongest will is sometimes not master. Leuret depended much upon reasoning added to intimidation. This would be in such cases contrary to common-sense. Exhortations and enforced logic are not only useless, they irritate and aggravate. The individual attacked by these dark thoughts does not wait to be advised, to oppose all the resistance to them he is capable of, and is only too inclined to condemn himself for the uselessness of his own efforts. Resignation to inevitable suffering, the ardor and confidence in an appropriate treatment, such are the truly rational prescriptions.

As to this treatment, hyperæmia or any other physical element constituting the basis of the disease, it is evident that without neglecting the moral action hope of success must repose especially upon the employment of pharmaceutical preparations to meet the monomania, or to remove all circumstances which might nourish the delirium; skilful demonstrations and opportune distractions are more particularly indicated. Experience, besides, is confirmative. This broad application of physical agents is not less fruitful spread out over the immense class of imbeciles, and commencing with that of the lypemaniacs, till now too often abandoned to the good graces of time or Nature.

Nothing, however, shows more definitely the efficacy of our distinctions than the clearing up of judicial cases where light has taken the place of confusion. The considerable part taken by partial diffuse delirium in the perpetration of acts prompted by imputability, may be touched with the finger. As to the largest number the accused are pseudo-monomaniacs who, forgetting themselves in their paroxysms, have ceded to blind instigations. By analysis it may be explained as perfectly reconcilable, both the fatal consequences of an automatic fascination and that lucidity which during the trial deceives, but in no way proves that at the moment of the incriminating act the delinquent was a free agent, and should be declared responsible. The attempt has been made of late years to make of insanity a principle of absolute legal exemption. Certainly, when the misdeed proceeds from the delirium, the limit then lies between the physiological condition and the disease. But in the monomaniac and *a fortiori* with the pseudo-monomaniac the same element coexists and alternates, in its manifestations with the morbid element. Animated by passions, subservient to their own interests, like every one else, the one and the other, within a certain sphere, are capable of well-considered and free-willed determinations. It appears, therefore, that we have here to consider what influence the mental trouble, at times restrained and fleeting, is of a nature to exercise on the general life. Delasiauve, not without grounds, held his opinion in reserve. What above all makes this reserve a legitimate one, is, that in civil life many monomaniacs and pseudo-monomaniacs take part in acts the validity of which are beyond suspicion. One of these latter, who spontaneously came to seek a retreat in Charenton, where he remained fifteen days, has not ceased for ten years to act as the head of an important commercial house. These cases are common. A few only occasion judicial discussion, finally, either by interdiction or by the cancelling of a deed of sale or the breaking of a will. The judicial decisions are as diverse as the conclusions of medical experts.

We have cited some examples. If, including all those which our annals contain, or which are met with in practice, they are examined with care, that examination, while opening unexpected views to science, would contribute, without doubt, to extend and define the code of medico-legal insanity. Delasiauve, in a sort of epilogue to his essay of 1859, says: "Have we completed the era of our investigations? A whole list of revealed desiderata extends its boundaries farther and farther. But supposing that we have struck the right road, the activity which characterizes the ranks of inquirers, and the quick sap of the rising generation, give good omens that the empty places will soon be filled up, and that we are even now about to touch the goal of our statutes" (this article was read before the Medico-Psychological Society), "where Medicine and Philosophy, having forever joined hands, will together spread their legitimate and salutary influence upon all appliances, humanitarian, legislative, hygienic, educational, and moral. Thus, each step of progress adds to the length, in other words the power, of the lever of the future."

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